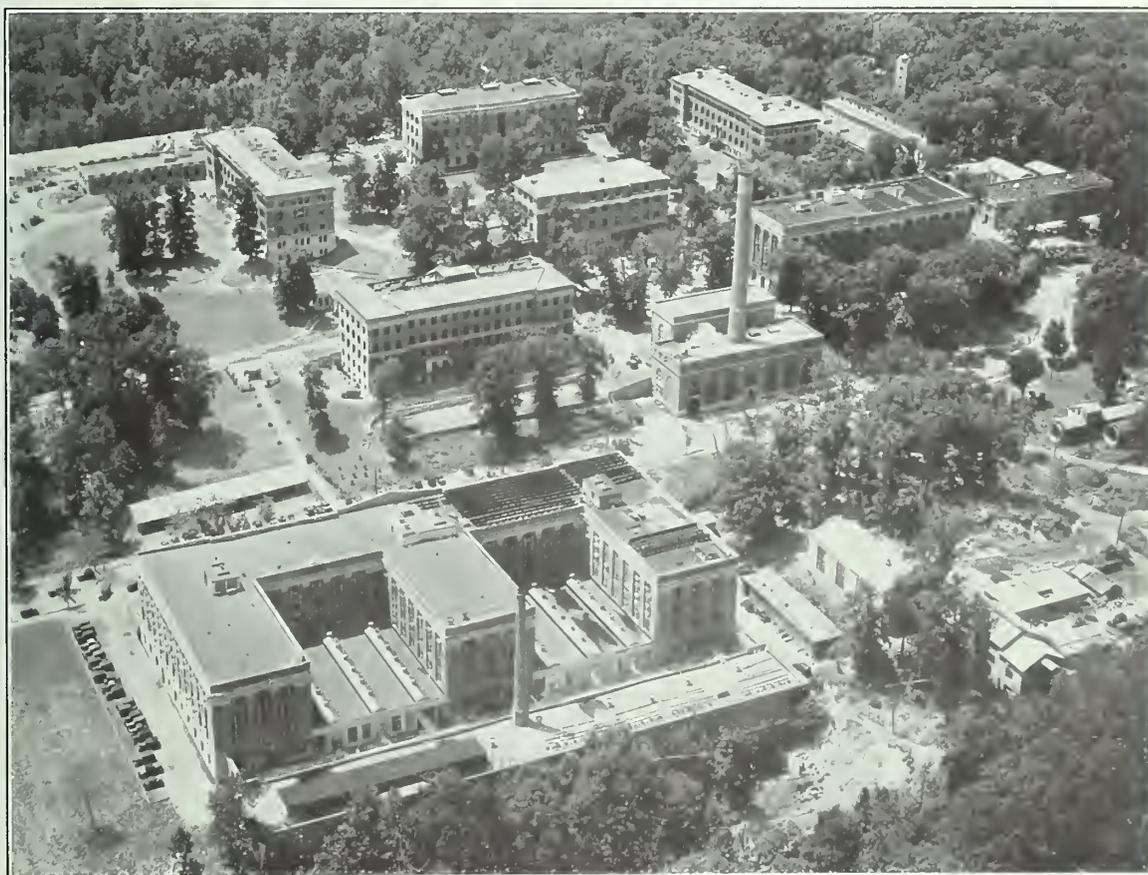


# COMMERCIAL STANDARDS MONTHLY



*A Review of Progress in  
Commercial Standardization and Simplification*



Photographed by Army Air Corps

AIRPLANE VIEW OF BUREAU OF STANDARDS (LOOKING SOUTH)

ISSUED BY THE BUREAU OF STANDARDS OF THE UNITED STATES DEPARTMENT OF COMMERCE, WASHINGTON, D. C., U. S. A.

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APRIL, 1932

## The Commercial Standardization Group

### DIVISION OF SIMPLIFIED PRACTICE

*Edwin W. Ely*

The division of simplified practice cooperates with industrial and commercial groups to reduce waste, usually through eliminating unnecessary variety of product, method, or practice. Its function is to bring together all parties interested in a project of this character, and to coordinate their work in developing a simplified practice recommendation. Such work includes surveys of current practice, formulation of a simplified practice program, and presentation of that program for action by a general conference representing all interests. The division then transmits to all concerned a full report of the general conference, with a request for written acceptance of the action taken. When the volume of acceptances is sufficient to indicate initial success, the Department of Commerce indorses the program and publishes the recommendation. The division thereafter cooperates with a standing committee appointed by the industry concerned, in conducting periodic surveys to determine the degree of adherence, to maintain and extend support of the recommendation, and to secure data for reaffirmation or revision. Simplified practice may be applied to any commodity or activity in which it will reduce waste. The division stands ready to render service in developing and making effective any application of simplified practice which will reduce waste, stabilize business, or extend commerce.

### BUILDING AND HOUSING DIVISION

*J. S. Taylor*

The division of building and housing, formed in 1921, cooperates with business, technical, and professional groups in furthering construction activities. It works to modernize building codes and to encourage improved standards for the quality of building construction, and the practical application of the latest development in design and use of building materials.

It encourages home ownership through the development of an enlarged, steadier, more intelligent, and more discriminating demand for dwellings—the largest single class of buildings which the construction industries provide.

The division also cooperates with other governmental agencies and with many private business and professional groups in efforts to distribute building activity more evenly throughout the year and to secure less fluctuation from year to year.

The work on city planning and zoning has the broad objective of making buildings more useful through proper location with respect to other structures, stabilizing of land values and property uses, well coordinated thoroughfare systems, and well laid out public works.

### DIVISION OF SPECIFICATIONS

*A. S. McAllister*

The duties of the division of specifications are to promote and facilitate the use and unification of specifications. In doing so it carries on activities involving cooperation with technical societies; trade associations; Federal, State, and municipal Government specifications making and using agencies; producers, distributors, and consumers; and testing and research laboratories. It ascertains the Standardization and specifications promoting activities of the associations and societies, and brings to their attention the work being done by the commercial standardization group. It brings the Federal specifications and commercial standards to the attention of the maximum number of producers and users of commodities complying with these standards and specifications. It compiles and distributes lists of sources of supply of materials guaranteed to comply with the standards and specifications. It shows both buyers and sellers the benefits from handling nationally specified, certified, and labeled commodities. The division prepares directories of governmental and nongovernmental testing laboratories and the Directory of Specifications, and is working on an encyclopedia of specifications, the first two volumes of which have been issued, namely, "Standards and Specifications in the Wood-Using Industries" and "Standards and Specifications for Non-metallic Minerals and their Products." It also aids in preparing the Standards Yearbook.

STANDARDIZATION  
.. IS ..  
A CONTINUING PROCESS  
↔  
ITS AIM IS NOT FIXITY  
OR STAGNATION  
.. BUT ..  
TO ADD SERVICEABILITY  
AS OFTEN AS THE  
POTENTIAL GAIN  
MAKES IT WORTH WHILE

### DIVISION OF TRADE STANDARDS

*I. J. Fairchild*

The division of trade standards, on request, assists industrial and commercial groups in the voluntary establishment of standards covering grades, quality, dimensional interchangeability, or other acceptance criteria as a national basis for marketing manufactured commodities.

The detail criteria are selected or determined voluntarily by interested buyers or sellers, without any Government dictation or domination, and adjusted at a general conference of producers, distributors, and users so as to represent the composite views of all branches. The division functions chiefly as a neutral agency to see that all interested elements are given full opportunity to be heard and satisfied; to solicit and record acceptances; and to publish and promulgate the standard when a satisfactory majority of acceptances is obtained and provided there is no active opposition.

Industries are encouraged to apply self-certifying labels to products meeting the commercial standard requirements, as a means of protecting the consumer and the scrupulous seller from misrepresentation or unfair methods of marketing.

Provision is made for regular revision of the standard through the appointment of a standing committee to consider periodically any necessity for revision of the standard, in order that it may be kept constantly compatible with progress in the industry.

# COMMERCIAL STANDARDS MONTHLY

## A Review of Progress in Commercial Standardization and Simplification

VOLUME 8

WASHINGTON, D. C., APRIL, 1932

NUMBER 10

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### AN INVITATION TO VISIT THE BUREAU OF STANDARDS

A cordial invitation is extended to all interested in scientific progress to visit the laboratories of the Bureau of Standards when in Washington. A personally conducted trip is organized at 2.15 p. m. daily except on holidays. Special trips for groups may be arranged at other times by writing to the bureau in advance. The bureau's illustrated Visitor's Manual may be had for the asking. This lists the work in progress and gives an airplane view of the ensemble and a brief statement of typical discoveries and inventions which have been notable, basic contributions to radio, aviation, and other modern arts and industries.

# Inspection of Machinery for Naval Vessels

*Naval Bureau of Engineering Tests Materials to Determine Standard Qualifications*

By REAR ADMIRAL S. M. ROBINSON, U. S. Navy



THE BUREAU OF ENGINEERING is the branch of the Navy Department that is charged with the design, supply, and upkeep of main propelling machinery for naval vessels, most of the auxiliary machinery necessary to their operation, and all radio equipment for naval vessels and shore stations. The bureau purchases from the industrial concerns of the country the machinery, apparatus, or material which it requires for the upkeep and maintenance of ships in commission or for installation in new vessels. The purchases must conform to specifications which are drawn by the bureau to describe in detail the material required and to furnish the basis of the contract between buyer and seller.

These specifications in many cases eventually become Federal specifications governing purchases for all branches of the Government. In any case they tend toward standardization of the product on a high plane and are thus of service not only to manufacturers but also to the country at large.

To pass upon material furnished under contract and to accept or reject it according to whether it meets or does not meet the specifications concerned there is maintained an inspection force. As a result of the strictness and impartiality with which this force functions, it is called on each year to inspect an increasingly large amount of material for other Government activities.

The bureau maintains a number of laboratories where machinery or apparatus of probable value to the Navy is tested and an unbiased report made on it. At the laboratories or test plants tests are conducted on machinery furnished under contract when the specifications require this to be done. Experiments are conducted to determine its fitness for the purposes intended, or what changes or improvements might make it more applicable. The tests and developments at the laboratories are primarily for the benefit of the Navy, but eventually they result in benefit to the manufacturers and purchasers of the country at large.

In the exercise of these functions the Bureau of Engineering is in intimate daily contact with the industries of the country. It is, and properly should be, in no small degree dependent on industry for much of its detailed design work as well as for the supply of a thousand and one things from cotter pins to main engines for battleships. But the bureau occupies not merely the rôle of a customer. Its beneficial influence in the field of industry may be more readily appreciated by considering one of its major functions.

The Bureau of Engineering is responsible for providing its ships with the very best design of machinery and equipment that the country's manufacturers are at the moment capable of producing. Development of reciprocating engines, which began at the end of the war between the States, was carried on and only ceased, except in special cases, with their final appearance in the U. S. S. *Oklahoma*, where the bureau's design represented the best that could be obtained from such a type of engine.

## IMPROVING QUALITY OF LEATHER MANUFACTURES

### Simplification and Standardization Facilities of the Bureau of Standards Directed to Promote Understanding Between Buyer and Seller of Leather and Leather Manufactures

For the purpose of developing a simplified list of sizes for trunks the National Luggage and Leather Goods Manufacturers' Association and the National Luggage Dealers' Association, in 1927, appointed a simplified practice committee to study the matter and draft a tentative recommendation covering the sizes necessary to meet public needs. For several years leaders in the industry have felt that such a list would prove beneficial to merchants in being able to carry a complete stock at a minimum investment, and decidedly helpful to manufacturers through reduction in the number of models.

In 1929 the simplified-practice committee submitted a tentative list of sizes for wardrobe, dress, steamer, three-quarter, and hand wardrobe trunks; and for women's suit cases, tourist cases, Pullman cases, new type wide case, and wardrobe hat boxes. This project was approved by associations representing the baggage agents, clothiers and furnishers, department stores, and railways.

The simplified-practice recommendation developed by the industry's committee was presented to all interests at a general conference on May 11, 1931, and is now before the industry for acceptance. The recommendation as approved at the general conference covers standard stock sizes for wardrobe trunks, dress trunks, steamer trunks, and hand trunks. Such items as "specialty," "odd sizes," "extra-capacity," and "all-garment" trunks were not included. Nomenclature forms a part of the simplified practice recommendation, as does the subject of trunk hangers.

This program recommends reductions in variety of sizes, as follows: Wardrobe trunks, 91 to 4; dress trunks, 102 to 3; steamer trunks, 68 to 3; hand trunks (tray style), 55 to 4; and hand trunks (wardrobe style), 46 to 3.

The simplified-practice recommendation will become effective following formal approval by all interests.

Ladies' suit cases is the subject of another simplified-practice recommendation which was developed simultaneously with the program on trunks, and by the same committee. In the course of the survey it was found that the carrying of dealer stocks composed of a complete range of sizes, in many colors, involved a considerable investment. It is interesting to note that in one of the largest stores 60 per cent of the total inventory of luggage was in ladies' suit cases which represented only 20 per cent of the sales. Obviously money was tied up in the luggage department of this store because of the excessive variety in sizes and types of suit cases.

In accordance with action taken at the general conference on May 11, 1931, a simplified list of dimensions is recommended covering lengths, widths, and depths for a stock line of ladies' suit cases. The committee has stated that this list of stock sizes will cover 90 per cent of the normal demands.

According to some of the leading manufacturers and dealers, the cooperation of all concerned in adhering to the simplified-practice recommendation for ladies'

suit cases should make it possible for the manufacturers to concentrate production on fewer sizes, thereby reducing costs. It should simplify matters for the supply men by eliminating confusion in specifying and furnishing basic materials used in the construction of luggage. It is the belief of some of the leaders in the industry that if this simplification program is put into effect generally it will not only cut down the retailers' investment and increase profits, but will be of great value in other directions.

Effectively applied, this program will result in greater convenience in handling luggage on railways, steamships, busses, airplanes, and other conveyances. This recommendation will become effective following formal approval of all interests.

A number of other simplifications now in effect are of direct interest to the leather industry although they do not apply to leather itself. Examples are those recommendations covering elastic shoe goring, full disk buffing wheels, abrasive paper and cloth, and grinding wheels. Simplified practice has not yet been applied to leather itself, but a preliminary study is now being made of the classification of calf leathers with the idea in view of introducing simplification.

A commercial standard for bag, case, and strap leather has been established through the efforts of the bag, case, and strap leather group of the Tanner's Council of America, in cooperation with other interested producers and users of this material to provide a nationally recognized standard for the gaging of thickness. A table indicating thickness in terms of "ounces," millimeters, sixty-fourths of an inch, and thousandths of an inch is included in the commercial standard for the purpose of making ready comparison between these frequently used designations and proper tolerances are provided to allow for reasonable variations encountered in the manufacturing processes.

The term "ounce" is in reality a measure of thickness, a remnant of an older system of designating the weight in ounces of a piece of leather 1 foot square. The "ounce," according to present usage, is equal to one sixty-fourth of an inch. Millimeters are included for those using the metric system and should be particularly useful in most export trade while thousandths of an inch are included for the few companies accustomed to buying on this basis. The standard became effective August 1, 1931, and it is hoped that its use will eliminate much of the confusion and misunderstanding hitherto experienced in this branch of the industry.

In compliance with the recommendation of an advisory board organized as the result of a conference of representatives of State governors called by Secretary of Commerce in 1923, there has been prepared by the division of specifications of the Bureau of Standards, a directory of all known nationally recognized commodity specifications, the manuscript for the second edition of which is now in the hands of the Public Printer. An important section of the direc-

tory relates to specifications for leather and leather products.

As the result of consultation with all organized American producers the certification plan has been applied by the division to Federal specifications covering vegetable-tanned leather belting, lace leather, vegetable-tanned sole leather, and for vegetable-tanned upholstery leather. Every known American manufacturer of leather has been given the opportunity to have the name of his firm placed on a list of sources of supply of leather guaranteed to comply with the requirements of these specifications in case it is willing, when requested to do so, to issue a certificate guaranteeing the compliance of the leather delivered on an order based on one or more of these Federal specifications. About 100 requests for listings have been received from leather manufacturers. Plans are now under way to extend the application of the certification plan to include Federal specifications covering bag leather, hydraulic packing leather, and rigging leather.

The leather section of the organic and fibrous materials division of the Bureau of Standards takes an active part in establishing technical standards for use in drafting specifications for leather by the Federal Specifications Board and the different Government departments. The chairmanship of the committee on leather products of the board is held by a member of this section. Studies of the properties of various leathers have resulted in establishing Federal specifications for leather belting, sole leather, rigging

leather, hydraulic leather, bag leather, lace leather, and upholstery leather. Other specifications developed by individual departments with the cooperation of the Bureau of Standards include those for leather carrier satchels, brief cases, leather clothing, and safety belts. A further study of the properties of lace leather and vegetable-tanned hydraulic leather is now in progress which will lead to a revision of existing specifications.

A study of the properties of mineral-tanned hydraulic leathers is also being made in order to secure information for use in drafting a new Federal specification. This work, which is conducted with the advice and cooperation of technical experts in the leather industry, not only results in the establishment of quality standards for the consumer of leather, but also provides the leather industry with means for evaluating their products and guiding their manufacturing processes and practices.

Another specification activity of the leather section of the bureau has to do with the development of a national standard specification for vegetable-tanned leather belting in cooperation with a representative body of consumers and producers through the procedure of the American Standards Association. A subcommittee of technical experts representing the different interests has been chosen to draft the specification using the Federal specification as a basis. A member of the leather section is serving as chairman of this committee.

### CEMENT REFERENCE LABORATORY

The cement reference laboratory which was established at the Bureau of Standards, Washington, D. C., in 1928, is maintained jointly by the American Society for Testing Materials and the United States Government for the purpose of promoting uniformity and improvements in cement testing. Inspections of cement laboratories are made upon request without charge. Apparatus is tested and methods demonstrated. After an inspection has been made a report is sent to the laboratory which has been inspected, setting forth such details of apparatus and methods as are of particular interest. These inspection reports are considered confidential by the cement reference laboratory except when their release to certain offices is authorized by the laboratory involved.

A recent development, which will probably add considerably to the work of the cement reference laboratory, is the ruling of the Bureau of Public Roads, United States Department of Agriculture, to the effect that on and after April 1, 1932, that bureau will accept reports of tests of cement for Federal-aid projects only from those laboratories which have been inspected by the cement reference laboratory. A copy of the inspection report is to be furnished to the Bureau of Public Roads by the cement reference laboratory. The first inspection reports must show that the laboratory has been inspected since October 1, 1930, after which date inspection reports will be required at intervals not exceeding two years.

Laboratories which desire inspection should send their requests promptly to the cement reference laboratory, Bureau of Standards, Washington, D. C.

### KRAFT-PAPER SEALING TAPE

The simplified-practice recommendation covering No. 1 kraft-paper sealing tape (R114-30) has been reaffirmed by the standing committee of the industry, without change, for another year.

The recommendation, which has been in effect since February 1, 1930, provides a simplified schedule of widths and lengths of rolls of plain and printed tape made from 35, 60, and 90 pound basic paper, together with tensile and tear requirements for 60-pound tape which is commonly used for sealing fiber and corrugated shipping containers. It also provides for testing methods, packaging, and marking of this commodity.

### BRITISH STANDARD FOR LEATHER BELTING

The issue of a British standard specification for vegetable-tanned leather belting is expected to prove of considerable service, not only to engineers interested in power transmission but also to leather-belting manufacturers and tanners generally.

The specification covers the entire process of production from the raw hide to the finished belt, namely, the tanning, currying, and final make-up. Adequate control of these processes is secured by means of suitable chemical and mechanical tests. The specification has been prepared with the collaboration of the Federation of Leather Belting Manufacturers of the United Kingdom, and the methods of chemical analysis laid down are those which have been drawn up by the Society of Leather Trades Chemists.

## CANNED RIPE OLIVES

### Uniformity of Pack Assured by State Inspection Service, with Grade Quality of Contents Marked on Containers

By W. H. TUGGLE<sup>1</sup>

For a number of years the olive industry has been in rather a chaotic condition due to a large extent to the lack of uniformity of the pack. While many of the packers used extreme care in the processing, grading, and handling of their fruit to produce the best product possible, there were some few who did not use this same diligence in their pack.

As distributed, there was a lack of uniformity in the quality of the canned products. Due to this lack of uniformity there was not the confidence in the pack that there should be.

For instance, if one bought a can of olives that gave entire satisfaction it is very possible that the next purchase would not have been the same, leaving doubt in the purchaser's mind as to whether or not he was getting the desired quality. If doubt exists there is, of course, less interest in the product and one is naturally more reserved in purchasing, but when all is done and said any product which is purchased in a can is taken on trust, as consumers must have confidence in the product and feel assured that they will receive a product which will meet with their desires.

It is impossible to tell what is being bought until the container is opened and ready to serve. For this reason the growers and packers decided that the best method of creating the desired confidence of the consuming public and in order to assure them of a uniform quality product was to inaugurate a standardization law to be enforced by the State department of agriculture. With this inspection under the law a more uniform and better quality grade of merchandise is assured, encouraging the confidence of the consuming public.

About two years ago the packers called upon the California State department of agriculture for co-operation in framing a law which would be of assistance to the industry. Many meetings were held throughout the olive-canning industry, and the question of standardization was discussed in detail.

The State department of agriculture, at the request of the growers and packers, had prepared and submitted to this body a standardization act which was finally approved by the industry. At the last session of the California State legislature, the industry presented a measure which was enacted into law. The law became operative for all fruit packed subsequent to October 1, 1931, on which date the standardization law became effective, and the inspection work was begun by the State department of agriculture.

The law provides for a minimum grade. All olives below this grade are required to have the lid of the can marked with the word "Seconds." This is a protection to the consuming public and a warning that any fruit in a can marked "Seconds," indicates that

the fruit, while sterile, clean, and wholesome, is not of the highest quality and contains certain defects detrimental to the grade.

For instance, olives may be slightly blemished to the extent as to be unsuited for a higher grade but still wholesome and edible. Olives may be of a size too small to be included in the upper grades but still wholesome and edible. There may be other slight defects, such as a percentage of olives that are at variance in color, lacking in uniformity of size and texture, which may be not so pleasing as the higher grades. This class of food would be marked "Seconds."

As a further protection and as a further interest to the consuming public, the law requires that a cut, representing the size of the fruit in the container, be shown on the label with a declaration of the approximate number of olives contained. This is done to inform the purchaser of the actual size of the fruit he is buying and the number of olives which the can may be expected to contain.

Olives are one of the oldest foods of the human race of which we have any record. At the time of Noah's ark, when the storm abated and the dove was sent out, we are told that it returned to the ark with an olive branch. We understand that there are olive trees in Palestine producing olives for food to-day that are more than 2,000 years old.

It will be seen that it is hard to tell how long an olive tree will last and produce fruit. In California olives are produced in marketable quantities from upper Tehama and Butte Counties to lower Imperial and San Diego Counties. The importance of this industry to California agriculture is easily appreciated.

There are many varieties of olives produced in this State, and canned as California ripe olives. Names of a few of the most prominent varieties are the Mission, Manzanillas, Sevalliana, Escalona, and others. The first two named varieties are the largest of the canned ripe olives packed. The other varieties mentioned are commonly known as "Queen," due to their very large size and the method of processing.

Of these, outside of the fruit canned as ripe olives, there is fruit processed in the Spanish style by fermentation by lactic acid. Others are packed in the Sevilian style, that is, pickled with flavoring of herbs packed in brine. The Mission and Manzanillas, in addition to canning, are processed in the Greek style, that is, in a dry salt pack which requires that the fruit be extremely ripe before processing into this style of pack. These are sold in bulk. The fruit which is not of a sufficient size and quality to be canned is turned into olive oil, which is produced by the pressing of the fruit and the extracting of the oil, which is used in salads, for cooking, and medicinally.

With this background as to the different varieties, we will consider the question of processing and preparing the fruit for canning. The orchards are

<sup>1</sup> Supervising Inspector, canned fruit standardization, bureau of fruit and vegetable standardization, department of agriculture, State of California.

watched carefully and when the fruit has reached the desired maturity it is harvested and graded.

By grading, we mean it is graded for size and for color. It is then placed in an alkaline solution to remove the strong astringency which exists in the green, unprocessed fruit. When the fruit has been in the alkaline solution long enough for it to be cut to the pit, then it is removed and put through a series of washings whereby all of the alkaline solution is entirely removed from the fruit.

Now brine is added, giving the delicate flavor which is so desired by all connoisseurs of this product. After the pickling and brining before the fruit is canned, it is aerated by the forcing of air through the tanks containing the fruit, causing an oxidation which pro-

duces the desired dark brown and black color of a uniformity which can not otherwise be secured.

In the early process, before the aeration in the tanks was discovered, it was necessary to turn off the liquid to expose the fruit to the air to secure this oxidation which was oftentimes very irregular and much more expensive to handle. The aeration method has been found to be the most satisfactory method of securing the uniform color preferred. The fruit is again inspected and sorted for color and all of the defective fruit is cast aside. After this sorting it is canned and sterilized by the application of a high temperature under pressure to insure an absolute sterilization and the maximum of safety from any spoilage which might occur in the canned product.

## TRADE-ASSOCIATION OPPORTUNITIES

### Many Trade Associations Have Proved Their Ability to Withstand the Tests of Business Prosperity and Business Depression

By CHARLES F. ABBOTT<sup>1</sup>

The day has arrived when all business men should enlist in the war against depression. For more than two years we have seen conditions grow gradually worse and no constructive remedy offered the thousands of small business organizations which have been compelled to live on their capital reserve. Competition has reverted to a mad fight for the small volume of sales existing at any old price.

We have been forced to adopt trade associations out of economic necessity. Such organizations prior to the World War were largely social and but rarely economic. Prior to the enactment of the Sherman Law about 40 years ago there were some trade pools organized which attempted to set prices at which commodities would be sold, but we find that when economic conditions broke the prices they went to lower depths than would probably have been the case had there been no pools in the first place.

Trade organizations, however, took a new turn in 1919. After the war the country was faced with the necessity of reverting to peace-time industries. Excess war capacities in some industries made many technical changes necessary. At the invitation of Herbert Hoover, then Secretary of Commerce, industries were requested to organize for the purpose of standardizing their product, eliminating unessential models, styles, and sizes, and, in general, to reduce the industrial waste that amounts to billions of dollars annually in misfit goods.

It was this standardization of product and the elimination of waste which did much toward alleviating the business distress of 1920. But the movement was started too late and was too new to forestall the depression in its full. Industrial coordination proved its worth in that instance, and during the 10 years since efforts have been made to perfect the science of trade organization and improve the art of management.

Trade and industry must serve and not make servants of its public. As much as we have been flouted

with the charge that the machine is making a slave of man, we know that such can not be the case, for invention and technological improvements must free mankind of all sense of economic lack and limits if the machine is to endure. And so must trade associations in the final analysis prove their value to the public at large to withstand the trials of business prosperity and business depression. Trade associations are permitted to collect and disseminate information regarding production, stocks, and shipments. They are permitted to establish standard methods of cost finding. In most of our trade-practice rules we have gone on record as affirming the requirement that contracts shall specify quality as well as quantity, and we have made great progress in the fixing of standard sizes and uniform designations. Many of our cooperative organizations have insisted that disputes shall be settled under arbitration codes, and that action be taken against bad practices, false invoice statements, and the like. Millions of dollars annually are being saved industry in the sale of its products because trade associations have come forward, and to this limited extent at least have endeavored to stabilize marketing conditions.

If ever there was a time when the trade associations should receive united moral and financial support it is during periods of distress. It is then that the combined energies of an industry should be set in motion and move forward aggressively. It is no time to retire or withhold support, and those who do are actually the ones who are preventing the progress that they, themselves, are most concerned in. Business revival always awaits leadership. Problems of an economic nature are so complex that industry must recognize its full responsibility, chart the course and supply the pilots. No harbor is ever reached by merely drifting. We can not depend upon success that places reliance upon chance, guesswork, or assumptions, and we must not hesitate.

The challenge to industry to-day is whether we are going to meet the issue and solve it effectively, or whether we are going to invite the Government to do it for us.

<sup>1</sup> Executive director, American Institute of Steel Construction. Abstract of his speech before the annual convention of the Institute of Scrap Iron and Steel (Inc.), Mar. 10, 1932, Washington, D. C.

## RESULTS OF SIMPLIFICATION IN THE MEDICINAL FIELD

### How One Company Eliminated 95 Per Cent of Its Items and Increased Its Sales More Than 400 Per Cent

By RALPH R. PATCH<sup>1</sup>

Simplification increases sales and reduces costs of doing business. These are primary results out of which have grown such secondary results as improvement in quality of product and service, more rapid turnover, and increased profit for the company.

Anyone will concede that simplification reduces costs, but it is not always clear that increased sales should be a consequence of intelligently applied simplification. Therefore the narration of one company's experience with the principles of simplification should prove of interest, especially in view of the fact that vastly improved stock turnover eventuated.

The E. L. Patch Co. began the manufacture of medicinal products in 1889. From the beginning high quality was a distinguishing feature of its products. The quality being good and the prices reasonable, sales should have shown a continued and rapid growth. However, this was not the case. After the first five years the growth was very slow.

Twenty-five years after the company began it was decided that something must be wrong, since the sales growth was slow and the profits small. Analysis showed that of the thousands of formulas made, none were made in lots large enough to make any appreciable showing in sales volume. This analysis revealed many details that were wrong, but, most important of all, it revealed that the fundamental policy of the company was retarding rather than promoting the best health of the business. Every officer and employee had been so busy with the mass of details necessary in such a complicated business that no one had had time to take an opportunity to think of ways and means of developing a large volume on any particular product. Individual items were small, and it was easy and natural to think in a small way.

In order to enlarge our thinking and our growth, some of the "dead wood" needed elimination. But where should we start? The salesmen felt certain that every item dropped from the list would mean a loss of sales to them. When they were shown that the combined sales of all the salesmen, on many of these items, did not amount to \$10 a year, it was believed that they had been won over. "But," said the salesmen, "if our competitors get only \$1 of the business of the good customers, it gives them an opening to get the rest of our business. They must not be given an opportunity to get their foot in the door."

For two years the simplification work went on. Items here and there were deleted, with new items substituted in cases where it was warranted by current demand. By 1916 the variety had been reduced from 7,630 items to 2,670, a reduction of 65 per cent.

The salesmen claimed the company had gone too far, for they had lost whole orders due to their inability to supply certain items which had formerly been carried in stock. In most cases these explanations were merely alibis for unsuccessful sales effort—it was so much easier to "take orders." Now and then

a salesman really did lose a sale for this very reason, but with the realization of this truth the company conceded that it could not expect more than its share of the total available business. At that point the simplification program really begins to get somewhere.

Whereas in 1916 a total of 2,670 items were carried in the company's catalogue, the total to-day is only 144. Moreover, during the period from 1916 to 1924 sales nearly doubled.

With increase in sales and decrease in variety of stock items, it became necessary to augment the sales force. Everyone worked hard to convince the salesmen that they could sell more goods and earn a greater income if they would but concentrate attention on fewer items. Frequent meetings were held by the salesmen, at which new sales points were developed and which were to be featured. Sales contests were used to arouse and maintain enthusiasm. As a result of all this special effort in the first year of the reduced line as much business was done in the 35 per cent of variety remaining as was formerly secured on the full line. Finding that the sales volume was keeping up and the manufacturing costs going down because of the increased production on the simplified line, the program was continued on both formulas and packages.

With more time to think about some of the products, ways and means were found to improve their quality so as to give better service. Sales were built on the fewer items. Larger sales at lower cost mean more profit. This profit was invested in research to find new products having larger sales possibilities and to find better methods of selling and distributing. Now, with only 5 per cent of the original line remaining, the volume of sales has increased 400 per cent.

In the old days if a man with proper scientific training spent one month studying one product alone the cost of that study would be repaid only in years of sales, because the sales volume on each product was so small. Now one man can devote his entire time to one product for five years. Such concentrated study means constant improvement in quality and large increases in sales.

Larger volume on a few items means a reduction of expenses in many directions. Per dollar of sales, we find savings as follows: Smaller investment, less depreciation, less supervision, less heat and light, less taxes, less insurance, smaller labor cost, less liability and worry, improved control, and increased turnover.

For every preparation dropped from the list there is saved space in the manufacturing department, in the bottle storage, and in box storage. There is one less label to buy and keep in stock, and one more empty space in the finished stock room. Per dollar of sales there is now one-third as much invested in real estate, machinery, and fixtures. This, of course, gives a proportionately lower yearly expense for taxes, insurance, depreciation, heat, light, and janitor service. Per dollar of sales there is only one-quarter as much invested in merchandise inventory. Yet with this

<sup>1</sup> President and treasurer, the E. L. Patch Co., Boston, Mass.

smaller inventory there are fewer back orders and delays than ever before.

With such a multitude of items the percentage of cost attributable to labor was much higher even though wages were lower. For example, the liquid department did not use enough of any style of bottle to warrant the quantity purchase of machine-made bottles. The filling could be done only by hand. Very frequently bottles having small cracks or pinholes which had escaped the notice of the bottle inspector were filled. The handling of leaky bottles and filling apparatus made it impossible for operators to have clean hands, with the result that every bottle had to be washed after filling. At the present time the bottling is done on vacuum filling machines which automatically eliminate all bottles with cracks or pinholes. No liquid drips or leaks on the bottles, nor are the bottles handled by soiled hands. Thus the washing after filling is entirely eliminated. This is just one example of the many that might be cited throughout the plant. Also, the fact must not be overlooked

that all this would not be possible if it had not been for simplification.

When one operator labeled 10 to 20 different kinds of preparations in a day it required a great deal of supervision to take care of 25 operators and make sure that the right label always got on the right bottle. Now a labeling machine drives ahead all day on only one product and increases the volume of work per operator, with but a fraction of the supervision formerly required.

The increased use of labor-saving machinery has made it possible to pay the workers more money than in the past. In the past when sales were poor the employees were laid off. Now by manufacturing orders in advance and placing them in stock our people are placed in position to have 50 weeks of work, with 52 weeks of pay, the year round.

With 16 years of experience behind us, the possibilities of simplification are so well known that the E. L. Patch Co. will continue to apply this principle of waste elimination where and whenever practicable.

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## THE SWEDISH STANDARDS COMMISSION

### Procedure Followed by the Swedish National Standardizing Agency Similar to That of the American Standards Association

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When the Swedish Bureau of Standards was created in 1922, one of its major purposes was the assumption of leadership in the field of standardization for Sweden. Members of its board are appointed by a number of industrial and technical organizations or institutions, which are connected with the bureau, and by certain Government authorities.

In 1931, when the bureau's official name was changed to Sveriges Standardiseringskommission (The Swedish Standards Commission), replacing the old name of Svenska Industriens Standardiseringskommission (The Standards Commission of the Swedish Industry), the rules of the bureau were changed in certain respects so as to indicate that the scope of its function also included nonindustrial standardization.

The procedure followed by the bureau in establishing standards may be described in the following manner: After an investigation and tests the bureau establishes the recommendation of the various constituent organizations which are then approved as Swedish standards. The bureau cooperates in the establishment of committees for considering new standards and to a certain degree actually carries out necessary tests. The bureau is also Sweden's representative in all questions pertaining to international standardization. As a general rule the bureau has been represented at the various foreign congresses held in recent years and has also cooperated along certain lines with all the Nordic standardization organizations.

As an example of this cooperation may be mentioned the steps that have been taken with a view to establishing a uniform standard for profiles of planed lumber. Tests along this line have resulted in the working out by the Norwegian organizations of a sketch of such standard, which has been published for approval by the industries concerned.

Since its inception the bureau has established 395 Swedish standards. Of this number 329 are industrial machinery standards, including a number of machine elements such as screws of all kinds, nuts, rivets, cotter pins, ball bearings, tubes and pipes, various tolerance determinations for diameter gages, etc., which have been developed from recommendations made by the Swedish Industrial Machinery Association. This association maintains its own standardization agency (S. M. S.), which is working exclusively on standardization matters and preparing recommendations regarding standardization in this field.

Upon the suggestion of the Swedish Electro-Industrial Association, a total of 34 Swedish electrotechnical standards have been established, as well as a number of "recommended standards," for electrical machinery and transformers, together with suggestions for rules governing the building of lightning arresters. The Swedish Electro-Industrial Association maintains a special committee for the handling of standardization matters. This special committee also functions as the national subcommittee of the International Electro-Technical Commission.

So far the bureau has established 23 Swedish standards in the agricultural-technical field, and has approved several suggestions as "recommended standards" which relate to carpentry and building fittings.

After several years of research and tests the Swedish bureau has established "norma regarding a uniform terminology for industrial cost estimates," as a provisional standard. Among other standardization activities on which work has already been started, may be mentioned the standardization of bicycle parts. Some 30 suggestions for standards in this field have been prepared and published for criticism and comment. During the year 1931 proposals were considered looking to the standardization of glass milk bottles and convex boiler ends.

## SERVICES OF THE UNDERWRITERS' LABORATORIES

### Inspection and Labeling Services and Their Value to Consumers

By A. J. BOMMER, *The Underwriters' Laboratories*<sup>1</sup>

The problem of fire and accident control has always been a matter of serious concern to those of us who are directly or indirectly responsible for the protection of homes or property from fire or the prevention of accidents and loss of life to humanity.

Fire protection and fire prevention are closely associated, and it is quite impossible for anyone to understand scientifically the protection of his home or place of business unless he has a fundamental knowledge of the essentials and proper methods of fire prevention. Fire protection refers to the proper construction and equipment of buildings to retard the spread of fire and to proper installation of all standard equipment for the extinguishing of fire, both in public and private service. It also refers to the training of men so that they may reach a higher degree of efficiency in the use of such apparatus.

Fire prevention finds its basic principle in the proper education of all citizens so means may be used to prevent fires from starting. This education instills in our mind the need for proper fire protection; the wise choice and use of public and private fire protective facilities and the general improvement of conditions, looking toward cooperation from all interests for the curtailment of life and property losses from fires.

The unwise judgment in the choice of fire-fighting and fire-protective equipment and the lack of knowledge concerning its use has been emphasized on many occasions. Many business men have not become interested in that which may have saved numerous lives and millions of dollars in the event of a fire or conflagration.

Now, what is there to protect the buying public and merchants so that they will know which kind of product to buy for fire control and thus spend their money wisely? Where may they look for advice on the purchase of an electric appliance, a gasoline pump, or an oil burner for the home? Where may they look for information on equipment necessary for constructing their homes and places of business, and how may they know and recognize such equipment when they get it?

The answers to these questions are in the lists published by the Underwriters Laboratories, where the names and markings of devices, appliances, materials, and machines, as well as the names of their manufacturers, are listed. All of the products included in these lists have satisfactorily passed the established construction and performance requirements of the laboratories, and the integrity of the listing is maintained by frequent inspections at the factories on subsequent production to see that the original quality of material and workmanship is upheld.

Underwriters' Laboratories first came into being back in the year 1895 by reason of doubts that existed in the minds of insurance underwriters about elec-

tricity. During the World's Fair in Chicago a young man named William Merrill, who had been inspecting fire-alarm systems for the Chicago Underwriters' Association, was given charge of the electrical inspections at the fair. Electricity was comparatively new in our lives at that time. No standards for installations had been worked out, and while Mr. Merrill worked he realized more and more the need for standardizing the requirements for safety in the use of electricity.

The insurance companies were already beginning to wonder what to do about electricity. Did it introduce a hazard that should be penalized by charging a higher rate on buildings where it was in use? Not if properly installed. But what constituted "proper installation"? This was the problem that William Merrill proposed to solve in an unprejudiced testing laboratory.

Finally succeeding in getting the backing of the proper insurance people, his first equipment consisted of about \$350 worth of testing apparatus, a table, and two chairs, which he installed in an unused room over the fire insurance patrol in Chicago. From the first the quality of the work done at Mr. Merrill's laboratory began to attract attention. Companies, who had been maintaining their own testing laboratories, began turning the work over to him. Each new account gave additional weight to his findings. The National Board of Fire Underwriters in New York became interested and took the laboratories under its wing, making appropriation for its work. Inventors came to him to approve the construction of their inventions before they offered them for sale, knowing that the approval would at once eliminate any question as to the safe design of the device, in the minds of the prospective buyer. Manufacturers learned that Underwriters Laboratories' approval was a strong point when it came to selling goods to any reliable wholesaler; and so on, down the line, through jobber, retailer, and to the ultimate purchaser.

But meantime lines other than electrical had been added to the laboratories' work. The accidental discovery of acetylene by a man in North Carolina in 1892 had put on the market any number of acetylene generators for various uses. Some were safe, some were not. The insurance companies again needed help. They asked Underwriters' Laboratories to install equipment for testing acetylene devices and said, in effect, "if Underwriters' Laboratories have approved the design of your acetylene plant, then no extra penalty will be added to your insurance premiums for having that plant on your property." Naturally, manufacturers at once began submitting their products to Underwriters' Laboratories, and reputable wholesalers began buying only such designs as were approved by the laboratories. In this way the dangerous, poorly designed generators were gradually eliminated.

Thus what started out to be just a testing laboratory for the insurance rating companies became, in effect,

<sup>1</sup> Abstract of address before the annual conference of Public Utility Buyers, National Association of Purchasing Agents, Birmingham, Ala., February, 1932.

an agent of safety. And people soon forgot to be afraid of acetylene and took for granted that, if they bought their plant from a reliable dealer, it would be perfectly safe.

Fire-fighting apparatus, building materials, safes, vaults, alarms, factory safety devices, automobiles, one classification after another, have been added until the scope of the work now includes anything involving a fire, accident, or theft hazard, or any device designed to eliminate such hazards. For instance, moving belts for use in factories are investigated because they involve a possible accident hazard. Tests are made of the safety guards designed to prevent such accidents.

Matches are tested, for in spite of their small size they are one of the most serious fire menaces. Tests are also made of sprinkler heads, fire doors and windows, automatic alarms—all kinds of devices for putting out or controlling fires.

At the present time Underwriters' Laboratories has offices in 141 cities, branch testing laboratories in New York and San Francisco, and an affiliated Canadian organization. Last year in the three laboratories 200 engineers and assistants were kept busy. Besides this, 250 outside inspectors carried on the "label service" work. The Underwriters' Laboratories label or imprint on a product means that the manufacturer has voluntarily invited the laboratories to inspect his factory output at regular intervals and certify that the product it is actually turning out is up to the standard of the sample article that was tested and approved at the laboratories. Sometimes daily inspections at the factory are considered necessary, sometimes weekly or monthly ones, coupled with checking up on samples of the product bought in the open market. The frequency of inspection depends on the nature of the product. With fire doors, for instance, every one is examined individually before the label can be placed upon it. If the factory inspections reveal the fact that the article being turned out is not up to standard, the right to use the Underwriters' Laboratories label on the goods is withdrawn. Last year 58,000 factory inspections were made.

One of our oldest members of this group is insulated wire. The difference between safe and unsafe insu-

lated wire is very simple. One can not tell from the outside appearance which wire is good and which is not good. It depends entirely upon the rubber insulation that surrounds the conductor and, in addition, the cotton or other braids that are woven over the rubber insulation. But from now on it will be easy to recognize standard wire when you buy, for it will be encircled every few feet with a small metal band bearing the Underwriters' Laboratories label, assuring not only that the design is right but that the factory production is adhering strictly to the standard set for safe insulated wire.

In most instances the insurance rates are based on materials, devices, or appliances that have been tested and found to comply with Underwriters' Laboratories standards for quality, reliability, fire protection, and accident prevention. When the insurance inspector checks over the premises and finds some part of the construction not properly protected (for instance, a fire door), he makes note of it on his report, and when that report comes into the hands of the raters, a penalty is charged. Consider this side of cost versus quality; perhaps a door carrying the Underwriters' Laboratories label would cost a few dollars more in the initial outlay of cash, but the penalty on insurance premiums goes on forever, and usually costs many times the difference.

Not only is the use of the phrase "Approved by the Underwriters' Laboratories" valued from an insurance viewpoint, but many people over the country, who have learned what Underwriters' Laboratories is and has been doing, have come to regard the listing or label as a safeguard to their lives and property, and they feel that they have received quality plus reliable service for the money expended.

Underwriters' Laboratories does not regulate installations of devices or materials, but the parent organization known as National Board of Fire Underwriters has prepared pamphlets and bulletins tending to regulate and suggest the correct methods of installation. Moreover, nearly all municipalities have set up inspection departments that are charged with the duty of supervising installation matters.

### BRITISH STANDARD TABLES OF DIAMOND INDENTATION NUMBERS

The increasing use of case-hardened and high-tensile steels has led to a more extensive adoption of the diamond pyramid indentation test in preference to the Brinell test, in which inaccuracies are caused by deformation of the ball when the indentation is small.

This has given rise to the need for recognized tables of diamond indentation numbers corresponding to the British standard Brinell numbers, and this need has now been met by the British Standards Institution in publication No. 427-1931, entitled "British Standard Tables of Diamond Pyramid Hardness Numbers."

Details concerning the method of carrying out the test are laid down and tables of hardness numbers are given for loads of 5, 10, 20, 30, 50, 100, and 120 kg. A pyramid having an angle of 136° has been specified as the standard, but an indication is also given of the correction to be made for machines using an angle of 140°.

### UNIFORM TRAFFIC DEVICES

A joint committee of the American Road Builders Association and the American Association of State Highway Officials has reported that a qualified central research agency is needed to lead to universally acceptable standardization of traffic devices.

While the highest praise is given to the efforts toward traffic signal standardization, some means of coordinating and improving past work must be adopted. Information obtained from a wide range of State, county, and city officials disclosed the fact that 70 traffic agencies agree in whole as to the need for a central traffic research foundation, 16 agree in part, and none disagree. Of those replying to the inquiry, 42 officials have to do with the purchase of traffic devices, the report explained.

Lack of factual information as to traffic devices and the need for coordinated effort to overcome existing confusion of traffic devices were strongly emphasized in the report.

## NATIONAL STANDARDIZATION IN CZECHOSLOVAKIA

### Review of Results Obtained, "Quality Marks" for Products Made According to Approved Standards Adopted to Insure Consumer Satisfaction

The standardization movement in Czechoslovakia centers in the Czechoslovak Standards Society, which is the recognized official standards agency for the country. As a member of the International Federation of the National Standards Associations, it represents Czechoslovakia in all international dealings in its field.

The society was formed in 1922 as an industrial corporation, but its board of directors consists of representatives of the industries and of the national Government. Other agencies, such as the Czechoslovak Electrical Association, concerned with electrical standards, and the Czechoslovak Research Association, dealing with research standards, cooperate with the society. These agencies, however, are bound by contract to submit their standardization projects to the society for approval before being recognized as Czechoslovak standards. This centralization has proved of great advantage and has affected favorably the rapid development of the standardization work of the country. The society is now divided into 185 special committees with more than 2,500 members who work on standards in all lines of production and commerce. The results achieved are worthy of note. Some of them are given below.

The specification covering sizes of paper forms is a standardization work of national importance. The first success in this respect was due to 60 sugar mills which standardized the text and the size of their blank forms, used in their routine work as well as in accounting. Owing to this within a single year sugar mills effected a saving of \$9,000 in outlay for paper blank forms, not mentioning their other internal savings due to the simplification of orders for paper blank forms and to the improvement in routine work. This example was followed by other industrial concerns, banks, Government offices, and schools.

The simplification of paper blank forms, as carried out by one of the largest iron and steel works, reduced the number of forms used by that concern from 950 to 10, and resulted in improved administration as well as improved operating and accounting system. The standardization of blank forms gave not only uniformity in size and shape but also a better classification and unification of their texts, all of which resulted in speedier and more nearly perfect work in the plants as well as in the accounting offices.

In September, 1930, the Ministers' Council recommended that the Government offices introduce standardized blank forms as soon as possible after the old stocks of paper forms were consumed. Acting on this recommendation, 12 of the departments have decided to introduce the standardized blank forms. The Ministry of Post has standardized all of its printed blank forms so that in the near future all forms used in the postal service, from note paper to parcel labels, will be standardized. The standardization of paper forms in railway administration will effect a saving of \$45,000 annually. Standardized paper forms have been introduced with success by a number of scientific,

industrial, and commercial corporations, provincial and district governments, municipalities, and communities. At present there are 138 trade journals published in the standardized size used all over the world. This uniformity is of advantage to readers, librarians, and editors. If we consider that the standardization of blank forms leads to a rationalized production and purchase of paper forms and that it directly results in the improvement of the organization of industrial concerns, offices, etc., we may estimate its economic value at several hundred million dollars.

The proper organization of office or clerical work is aided substantially by standardized types of office furniture and other appliances which are designed to conform to standardized paper blank forms, envelopes, and books and which, according to the results of psychotechnical tests, are best suited to speed up office routine work.

Interesting results were obtained by simplification and standardization in the iron, steel, and machinery industries. On the basis of the reduction in the number of screws one of the foremost machinery concerns has determined its maximum and minimum amount of stocks. It has reduced its former stocks by almost 50 per cent and has limited the production of screws to a smaller number of sizes and kinds. Mass production of screws has effected a 56 per cent saving as compared with the former production. The standardization of screw threads has led to the discarding of a number of various special screw threads used previously in machinery plants so that now only 6 screw threads in 168 sizes are used instead of the 12 types that were formerly used. This standardization has also decreased the number of expensive tools. The standardization of various machinery elements, such as wedges, cotton pins, etc., has enabled all machinery plants to specialize in the production of these articles. The simplification and standardization of wrenches have reduced their number from 50 to 21, and the appropriate combinations of these wrenches have resulted in a speedier assembling of machines.

In many cases standardization has brought about the introduction of new types or a revision of existing usages of many years standing. For example, on the basis of thorough tests the thickness of screw units has been reduced by two-tenths. The tolerances of screw iron have been decreased owing to standardization in order to conform better to the mass production of screws by automatic machinery. In a number of cases standardization has resulted in a considerable reduction in the production schedule. For example, smooth, seamless, steel pipes used to be turned out in 1,119 sizes and shapes, while only 116 remained after standardization. Prior to standardization there were 316 types of tempered steel fittings, which have been reduced to 39 types or 88 per cent through standardization. There were 7,850 types of gas and water pipes and connections of all shapes and sizes before standardization and 1,336 afterwards. The rules relative to the quality and testing of gas and water pipes

have introduced a new uniform water-pressure test, which is quicker, less expensive, and safer. The standardization of the sizes and quality of parquets has been of great importance for their rational production and trade, since it has taught the consumer to distinguish between the various grades of parquet flooring. Thus a rational use of lumber in the manufacture of parquets has been made possible.

The standardization of automobiles appears as a necessary requirement for the rationalization of automobile production and as the best way to lower automobile prices. The simplification and standardization of tires has reduced the number of their sizes from 212 to 35.

Carbon steel, which is the chief product of the Czechoslovak iron industry, has been divided by standardization into exact groups according to qualities and mechanical properties. The uniform mechanical tests make it possible to ascertain the guaranteed values easily according to symbols. Any sort of material may be easily ordered by reference to these symbols, and indicated in the construction drawings. Colored symbols for various types of steel make possible easy orientation and inspection in warehouses. Uniform rules covering deliveries and testing of steel materials replace the expensive drawing up of separate specifications that were formerly necessary in each individual case.

The uniform classification and nomenclature of iron, together with translations into foreign languages, facilitate trade relations with foreign countries. Very satisfactory results were obtained in the standardization of rolled iron beams. For example, the number of equilateral beams has been reduced from 150 to 70. Before standardization there were produced 30 different types of T beams; after standardization only 14. Standardization has reduced 45 different mine and field rails to 7 types, which were selected with a view to economy and technical requirements. The reduced number of rails has decreased very substantially the number of rolling machines not only for rails but also for rail connections; this again has reduced considerably the operating expenses of rolling mills. The standardization of industrial railways, which reduced the former 70 gages to 5, has been readily accepted. The standardization of gages has facilitated the systematic standardization of car wheels and trucks.

Due to the establishment of standard shades for enamel varnishes the former number of 600 colors has been reduced to 18, which include white and red. This considerable reduction in the number of colors has not only rationalized the production but has also brought advantages to retail trade, which has suffered from the constant mixing of shades required by customers.

Several standards covering various lines of production and trade have successfully solved the legal and technical relations between the producer and the consumer. Among others are the rules for testing cooling equipment and the instructions for testing elevators. These rules have furnished the domestic production a firm basis both for construction methods and the preparation of bids as well as for the quality of products.

The standardization of locomotives has been systematically put into practice for a number of years and has substantially reduced the time required for repairs. Thus standardization has contributed to a considerable extent to the assurance of uninterrupted operation of railways.

The systematic standardization within the building trades has been making progress. The uniform rules for statistical calculations of constructions, as well as the rules governing concrete, iron, and wooden construction, include all the new experiences and perceptions made in these lines and form a uniform and reliable basis for calculations, projects, and the taking over of such constructions. So far rules have been prepared for systematizing and standardizing work of joiners, locksmiths, roofers, and house painters. These rules have produced very practical results in practice. Rules are now being prepared covering the work of other artisans.

The standardization of doors and windows for dwellings will reduce the number of types and sizes and will shorten the time necessary for their delivery, since it will be possible to obtain them direct from stock. This will greatly speed up the rate of construction work. The standardization of paving stones, which was completed just before the beginning of the systematic reconstruction of highways, has enabled the stone quarries to turn out paving stones on a large scale and thus has contributed to an increased and uniform employment of stone quarries.

Mention must be made of the savings and advantages derived from standardization in the electrical line. The increased use of electric current, and the fair degree of safety of electric apparatus thus far attained, can be attributed to uniform rules governing electric elements, the systems of currents and tensions, electric machinery and apparatus, wires and cables, electric fixtures and illumination, high-voltage equipment, house installations, electric equipment in mines, plants, and workshops, physicians' electrical apparatus, construction of antennas, etc., as well as by the standards covering electric machinery, apparatus, their parts, installation supplies, etc. Important results have been achieved with respect to electric power plants, made necessary by the electrification of the country. In this line the standardization work embraces products as well as the operation of plants and trade usages. The results derived from this are far-reaching, although it is difficult at present to estimate their monetary value. The electric power plants are quick to introduce all standards as they look upon them as the results of joint experiences.

Many standards relative to electric apparatus, such as flatirons, vacuum cleaners, refrigerators, fuses, plugs, etc., have uniformly fixed the calculation, sizes, quality, tests, and guarantees of these products and thereby have greatly improved their quality because they are safer and more economical. The standardized electric products are now controlled regularly as a "quality mark" is affixed to them which testifies that the product conforms strictly to the requirements of the standard applying to the product in question. "Quality marks" are now affixed to insulators, switches, electric lamps, flatirons, vacuum cleaners, electric stoves, refrigerators, physicians' apparatus, etc. These marks guarantee the purchaser that the product is of standard quality.

## INVESTIGATING MACHINERY PERFORMANCE AND DESIGN

Bureau of Standards Undertakes Metallurgical Research as Service to Manufacturing Industry

By LOUIS JORDAN, *Bureau of Standards*

Modern machinery, throughout its entire range of increasing complexity, from the simplest of all machines, the lever or the wedge, to the complex mechanism of the automobile, airplane, locomotive, or turbine, is dependent on metals for materials of construction. The design and performance of machines reflects promptly and in great detail current advances in knowledge of the fabrication and treatment of metals. It is hardly too broad a statement to say that all research in physical metallurgy, either immediately or ultimately, is of interest to the builders and users of all types of machines.

Among the active research projects of the Bureau of Standards several of the problems in physical metallurgy are of rather immediate interest in this survey of machinery.

The wear resistance of metals may be mentioned first among these problems. Wear of a metal is the unintentional removal in service of the surface of a metal through the action of frictional forces. These frictional forces may be developed by the movement of a metal against a metal or of a metal against a non-metallic material. Obviously, every moving part of a machine which during motion bears on another material, either metallic or nonmetallic, is subject to deterioration by wear.

The laboratories of the Bureau of Standards have for several years been actively at work studying methods for evaluating in the laboratory the wear resistance of metals. Some of the more promising of these wear-test methods have been employed in studies of various types of bearing metals, both "white metal" (lead and tin base) bearing metals and bearing bronzes. Studies have also been made of the relative resistance to metal-to-metal wear of simple carbon steels which had been heat treated in different manners; of similar series of steels subjected to abrasive wear of sand; of the wear resistance of hardened steel plug gages as compared with nitride-hardened and chromium-plated gages. Some of the current research problems on wear are concerned with the effect of the surrounding atmosphere on the wear of metals; an analysis of the fundamental mechanism and a classification of the several types of wear of metals; the influence of grain size and internal stresses on the rate of wear.

The choice of a metal to be used in the construction of a part frequently involves consideration of the ease with which it can be machined. The efficient utilization of machinery in a production line is often dependent on the machining qualities of the material from which the product is being fabricated, or the successful use of a particular metal may depend entirely on the qualities and performance of the metal-cutting tools.

Studies of the machinability of metals and of the performance of cutting tools, largely restricted to lathe-turning and lathe-tool performance, have been

carried on continuously for the past 10 years at the Bureau of Standards. Published reports of this work have dealt with the effects upon tool performance (1) of changes in chemical composition and heat treatment of commercial and experimental high-speed steels and (2) of variations in chemical composition and heat treatment of the steels cut. Other investigations have been concerned with methods of testing the performance of the recently developed sintered tungsten carbide cutting tools, and with the relative machinability of structural alloy steels under heavy (roughing) cuts and under shallow (finishing) cuts. Current work is directed toward a study of the influence of severe machining conditions on the properties at and near the surface of the metal being cut.

Many machines or parts of machines are required to operate at temperatures which are very high or very low relative to normal atmospheric temperatures. The mechanical properties of metals change markedly with these relatively great changes in temperature. At elevated temperatures corrosion, oxidation, and scaling of metals frequently become excessive and even fatal to successful use. The structural metals which possess rather definite limits for safe loading at normal atmospheric temperature, behave at elevated temperatures in a quite different manner; that is, they creep or flow gradually and continually under very low loads. So, at elevated temperatures, time enters as a factor in the selection of safe working loads. This requires the use of a relatively new method of testing the mechanical properties of metals at high temperatures, the so-called "long-duration" or "creep" testing of metals.

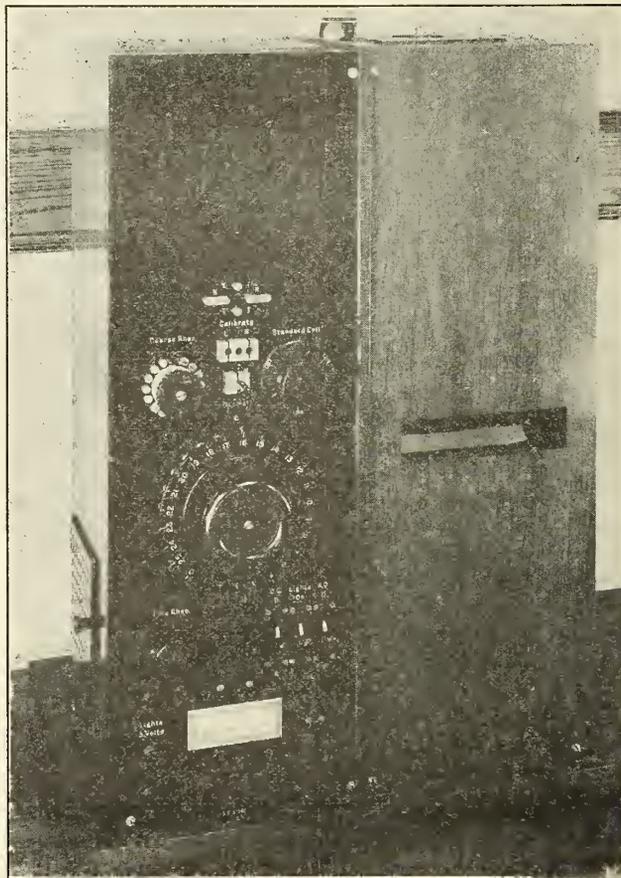
The Bureau of Standards has been for some time and still is active in such testing of metals at elevated temperature and has recently extended its activities to mechanical testing of metals at the very low temperatures of dry ice (solid carbon dioxide) and of liquid air. In certain phases of this work on the effect of temperature on the properties of metals the bureau is actively cooperating with a joint research committee of the American Society of Mechanical Engineers and the American Society for Testing Materials, a committee established by these two national societies in recognition of the extreme importance of this field of metallurgical research.

Other research activities of the metallurgical laboratories of the Bureau of Standards, which are of equal interest to machine builders and users, can be no more than mentioned in this brief review. These activities include such studies as the following: The changes in volume of metals during casting; the fluidity of metals, or better the ability of liquid metals rapidly and completely to fill molds when pouring castings; methods for controlling the condition of foundry sands; the corrosion of metals; failure of metals by fatigue, popularly but erroneously described as failure by crystallization.

## NEW ELECTRICAL MEASURING INSTRUMENT DEvised

In certain cases, as, for instance, when a large electric generator is being tested to determine if its efficiency comes up to the contract requirements, the economic importance of accurate measurements may become very great, and the expenditure of many thousands of dollars may depend upon a fraction of 1 per cent in the measurement.

In its February issue of the *JOURNAL OF RESEARCH* the Bureau of Standards published a description of what is called the "composite coil" type, which is particularly suited for measuring alternating current, voltage, or power, with extreme accuracy. This instrument (see illustration) operates on the same electrodynamic principle as the usual types of wattmeter. Its principal characteristic is that both the fixed and moving coils are formed of separate windings insulated from each other. One set of windings carries the alternating currents to be measured and produces a turning effect on the moving coil tending to deflect it up scale. The other set of windings carries direct current supplied by a 12-volt storage battery and tends to deflect the instrument down scale. The direct currents can be set by suitable control rheostat to that one of a series of definite values at which the torque produced by them is approximately equal and opposite to the alternating current torque. Any unbalanced difference in torques causes a deflection of the moving coil which is



measured by the location of a line of light on the instrument scale. The value of the direct current is obtained by comparing the drop in a known resistance with the voltage of a standard cell.

In this way the bulk of the quantity under measurement is referred directly to the standard cell and the errors in scale reading, spring fatigue, self-heating, etc., affect only a small part (2 per cent of full-scale value) of the total indication. The use of an astatic double system greatly reduces the effect of the earth's magnetic field and at the same time can be used to compensate for the otherwise large effects of mutual inductance between the alternating-current and the direct-current windings. Instruments of this type can readily be designed to have a precision of reading equivalent to that of an ordinary instrument with 1,500 scale divisions and still have a period of 3.5 seconds, and an accuracy approaching 0.01 per cent.

While larger and more expensive to manufacture than the ordinary portable instrument, it is sufficiently rugged to be useful in power-plant testing, and the precautions required in

operating it are not materially more elaborate than those involved in similar measurements of direct current by means of the potentiometer. It is hoped that American instrument manufacturers will take up this new suggestion and develop from it a valuable working tool for the electrical engineer.

### CAP-NUT STANDARDIZATION

In 1931 a committee of the Society of Automotive Engineers made a study as to the desirability of establishing a standard dimension for what are popularly termed acorn nuts. Data collected from various sources indicated a wide variety of styles and dimensions which have been reduced to two styles.

Due to the limited quantities of nuts of this type that are used, the crown has been designed purposely to give flexibility in application. When the nuts are made of brass, the height of the hexagon may be reduced to three-quarters of the thread diameter or even less, to lighten the appearance, but retaining sufficient strength in the threads in the nuts to meet the requirements when using the softer metals. Though the overall height of the nut is less by the amount that the

hexagon face is shortened, the tapping, being in brass, can be carried somewhat deeper than is practicable when tapping in steel. Finished appearance of the assembly in which this style of nut is used is the chief requirement, as the strength is necessarily limited by the material.

With regard to nomenclature, the S. A. E. committee feels that the term "acorn" is properly applicable to but one shape and that the term "blind" is appropriate from the manufacturing standpoint in referring to the tapped hole, which is not in evidence after the nut is assembled. The terms "crown" and "cap" are both correct as applying to the appearance of the nut. On account of its trade use in catalogues, the committee has proposed that the term "cap nuts" be adopted as the logical designation.

## THE ASSOCIATION OF EDISON ILLUMINATING COMPANIES

### Quality-Improvement Program of Association Serves to Improve Performance Value of Commodities Tested

If material which best fits the conditions or which offers the most advantages per dollar of cost is to be selected, the facts concerning qualities of materials must be available. Ordinary skilled judgment does not go far enough—the most discriminating numerical data, such as are to be obtained only in a laboratory, are required to supplement and reinforce such judgment.

In 1928 the annual meeting of the Association of Edison Illuminating Companies gave consideration to this subject and established a quality improvement program for customer's electrical equipment. The essential part of the program consists in collecting and reporting facts of quality and performance. This grading system represents present ideas of the form in which facts should be presented. It is to be given a trial and will be used only if it proves practicable and satisfactory. Numerical assignments in such a grading system can not be highly precise. Wherever practicable, grading assignments will be based upon test data or service experience. There will remain, however, some particulars in which judgment and estimation will have to be relied upon.

The quality-improvement program itself is not concerned primarily with standardization. It aims in general, as its name indicates, to bring about improvements in the operating characteristics of domestic electrical equipment. To this end determinations are made of the qualities of performance of all brands, makes, and models within each class. Information as to the findings is supplied to power companies sponsoring the work for private use in their purchases and promotional activities. Findings are also reported to individual manufacturers, in the case of their own products, and adverse indications are privately discussed with each of them. Every reasonable effort is made to cooperate with manufacturers who use the information so supplied in connection with efforts to bring about improvements in their products.

The relative performance quality of each brand, make, and model is expressed numerically by means of a method the technique of which has been carefully worked out by Electrical Testing Laboratories. This numerical expression gives ready guidance for the selection of that equipment whose quality and price are best suited to the purposes of the case in hand. Reported to a manufacturer, it informs him very accurately as to where his product stands in the market with relation to other products within the same class. A distinguishing characteristic of the quality improvement program as administered so far is that entire fields are studied and reported upon. Thus there is no group of unlisted, unapproved, or unaccepted products which may be unsatisfactory or may merely not have been submitted for examination, as is the case with most other arrangements so far devised for differentiating among the various brands, makes, and models of electrical equipment.

For the purpose outlined above the performance quality of any piece of electrical equipment is ana-

lyzed and each component of performance is studied separately; thus durability is studied independently of efficacy. Test results or field experience are utilized wherever possible. Otherwise reliance is had upon the combined judgment of a number of individuals technically qualified and experienced. The results of tests or judgments are then combined by weighting the various components of performance quality. This is illustrated in the following table, where the component features of performance quality and weights that have been assigned to each for various purposes are shown.

*Relative importance of performance features*

	Appliance plugs	Flat- irons	Ranges
Effectiveness.....	20	25	35
Durability.....	50	30	25
Convenience.....	10	10	10
Superior features.....	10	10	10
Ease of repairs.....	5	15	15
Freedom from objectionable features.....	5	10	5
	100	100	100

The final results are expressed numerically with a scale from 0 to 100, the higher figure representing the maximum possible attainment with the present state of the art. Appraisals of quality formulated in this manner are put forward carefully, limited by a statement of their probable accuracy.

In connection with the quality-improvement program, a survey was made of the United States market of domestic electrical flatirons. It was found, among other things, that terminal studs were of a great diversity in regard to form, dimensions, and spacing. This resulted in a corresponding variety among appliance plugs for use upon flatirons and other appliances. This matter was reported to the appliance committee, with a result that Electrical Testing Laboratories was directed to cooperate with the organized manufacturers in efforts designed to bring about a degree of standardization in appliance terminals and appliance plugs. The National Electrical Manufacturers Association has already made progress in this field.

Early in the work of the quality-improvement program there was discovered a great need for uniform practice in testing domestic electrical equipment for adequacy of electrical insulation. Such tests as were in use were largely empirical and differ greatly as to relative severity. Accordingly, determinations were made of the minimum values of electric current physiologically perceptible. Existing standards were carefully reviewed and efforts made to select a proof voltage for empirical tests that should be reasonable in magnitude in comparison with voltages used by others for similar purposes. It had been found that test voltages of this kind ranged all the way from 500 to 10,000 volts, with a preponderance in the vicinity of 1,000 volts.

The appliance committee of the Association of Edison Illuminating Companies, upon the recommendation of Electrical Testing Laboratories, has directed the imposition of the following test requirements upon all domestic electrical equipment coming within the scope of the quality improvement program: (1) Insulation resistance under any probable conditions of use, including atmosphere at high humidity, at least equal to 600,000 ohms for each 110 volts of working potential; and (2) successful imposition of an alternating potential of 200 volts plus twice the maximum working potential, at 60 cycles, for one minute between current-carrying parts and exposed conductive surfaces.

This procedure has been followed for more than two years, during which time there has developed no indication of need to revise these figures.

NOTE.—The results of original studies resulting in the recommendations that these standards of adequacy for electrical insulation be established are contained in E. T. L. report No. 845S3, entitled "The Insulation of Domestic Electric Appliances," and in laboratory report No. 3338, entitled "Physiological Perception of Alternating Current." Copies of these can be had upon request to the Electrical Testing Laboratories, Eightieth Street and East End Avenue, New York, N. Y.

Safety in the use of electrical equipment was recognized from the first as an important component of quality of performance. Efforts were at first made to utilize the determination of others in respect to safety of this equipment. This was found to be impracticable, however, because of serious deficiencies and unsatisfactory practices in existing procedures. Accordingly, it was necessary to undertake the independent determination of safety. For this purpose a study was made of all available material, especially all known standards or specifications having to do with safety and including such standards in use in foreign countries. An effort was then made to formulate a state-

ment of safety requirements beginning with very general expressions and proceeding logically therefrom to more detailed specifications. The resulting document has been entitled "Proposed Safety Requirements for Electrical Equipment to be Used by the Public."

Originally drafted at Electrical Testing Laboratories, it has been reviewed and criticized by dozens of well-qualified engineers in electric power companies, and revisions have been made in the original draft in accordance therewith. As the document stands today, therefore, it represents the best thought on this subject among qualified engineers in the public-utility industry, and it has been reviewed on behalf of the organized manufacturers.

In connection with the work for the appliance committee of the Association of Edison Illuminating Companies there has been developed a general and comprehensive outline of tests applicable to any kind of domestic equipment, but with appendixes especially designed to suggest test schedules for the following: (1) Domestic electric flatirons, (2) domestic electric ranges, (3) domestic electric toasters, and (4) domestic electric water heaters.

There have also been developed in similar fashion test procedures for appliance plugs and heater cords, but in these cases the procedure developed called for the use of special laboratory equipment designed and constructed for the purpose. Copies of the general outline of tests for all domestic equipment and for any of the appendixes listed above will be supplied upon request to Electrical Testing Laboratories. It is hoped that they may be further improved and used as guides in efforts to bring about standardization of test methods in this field so that greater comparability of test results may be had with consequent advantage to all concerned.

### DRESS PATTERNS

After having been in effect since January 1, 1930, "Dress Patterns, Commercial Standard CS13-30" was reaffirmed, as originally issued, for the year ending January 1, 1933, or until authorized revisions are duly indorsed. Announcement to this effect was circulated to the interested distributors, manufacturers, and users.

This commercial standard establishes a standard classification for ladies' and children's dress patterns, with corresponding basic body measurements for each size.

Reaffirmation was authorized by the standing committee which reviewed results of a survey covering production of commercial dress patterns during the six months' period ending September 30, 1931.

A brief report summarizing the replies from manufacturers received in the adherence survey was circulated with the announcement. Complete adherence to the standard classification and corresponding measurements was reported by all who replied, and all but one reported actual direct benefits from the commercial standard. No changes were suggested, but the extension of the standard to cover additional measurements and wider use of the existing standard were believed by some to be desirable.

### FEDERAL SPECIFICATIONS

Fourteen specifications were acted on by the Federal Specifications Board during the month of March. Of this number 10 were submitted for revision and 4 for consideration as proposed specifications. Copies of these specifications (in mimeographed form) and further information can be obtained from the Federal Specifications Board, care Bureau of Standards, Washington, D. C.

New designation	Specifications to be revised	Former E. S. B. designation
N-P-101a.....	Paste, office.....	N-P-101
Z-A-611a.....	Apples, canned.....	Z-A-611
AA-C-571.....	Cots, folding, canvas.....	240
FF-F-101.....	Fasteners, paper, brass.....	377
PP-O-956a.....	Oysters, fresh.....	PP-O-956
QQ-B-671.....	Bronze, aluminum, castings.....	369a
UU-P-101a.....	Paper, bond, rag, white and colored, tub-sized, air-dried.....	UU-P-101
ZZ-G-421.....	Gloves, rubber, surgeons'.....	229
ZZ-G-466a.....	Hose, gasoline, rubber-metal.....	ZZ-G-466
DDD-R-51.....	Rugs, Axminster.....	502
Specifications proposed		
	Buttermilk.....	
	Cheese, cottage.....	
	Cheese, Swiss.....	
	Ice cream.....	

## APPLYING SIMPLIFIED PRACTICE TO MACHINERY

Investigations Carried on by Bureau of Standards in Cooperation with Industry

By EDWIN W. ELY, *Bureau of Standards*

It is a recognized fact that standardization of an entire machine is difficult to accomplish and almost impossible to maintain. Such standardization, even though apparently successful, tends to prevent development and to retard the progress of the industry. It may also cause difficulty in connection with the use of patented devices used by different manufacturers of the same type of machinery. Standardization of the parts which make up the finished machine, however, is entirely practicable and results in appreciable savings when based on sound principles.

Because of these conditions, there has been completed no simplified practice recommendation covering complete machines. Many tools and machine parts, however, have been simplified, and there are at present under way several projects in the machinery field which will, if completed, eliminate much waste in the manufacture and maintenance of machines.

There are available printed simplified-practice recommendations for milling cutters, die-head chasers (for self-opening and adjustable die heads), grinding wheels, abrasive paper and cloth, abrasive grain, carbon brushes and brush shunts, roller bearings, metal spools (for annealing, handling, and shipping wire), skid platforms for shipment of machinery and machinery parts, and industrial truck tires. All of these products are used either as component parts of machines or in direct connection with machines; for example, the three recommendations on abrasive materials, namely, grinding wheels, abrasive paper and cloth, and abrasive grain for polishing purposes,

are used on machines in various forms in the production and finishing of other products of commerce.

There is in progress a survey in the field of textile machinery covering wooden filling bobbins, quills, taper paper cop tubes, and spindles. This survey is being conducted by the industry itself as a basis for a specific simplified-practice recommendation.

Laundry machinery is another subject that is at present under survey by the industry. The particular items to be considered in this field are washers, extractors, tumblers, ironers, and pressers. The final result will be one or more programs recommending to all interests the elimination of seldom required sizes and varieties of the several items. Such elimination will affect primarily stock items. As is always the case, an effort will be made to prepare recommendations that are beneficial not alone to the machinery manufacturers, but also to distributors and users of the machines.

The machinery field offers many opportunities for simplified practice, with attendant advantages. Stocks of replacement parts may be reduced to a minimum, interchange of bolts, nuts, screws, jigs, and the like may be assured, and the manufacturer placed in position to produce for the known demands of the trade.

These ends may be approached through the concerted action of all interests, through factual surveys, conferences, and signed approval of those affected. In the process the division of simplified practice of the Bureau of Standards acts as a neutral centralizing agency.

## AMERICAN STANDARDS ASSOCIATION

### Association Activities During March

The following current information concerning developments in standardization projects under the auspices and procedures of the American Standards Association has been furnished by that association:

*Standards for flanges published.*—The American standard for cast-iron pipe flanges and flanged fittings for maximum nonshock working hydraulic pressure of 800 pounds per square inch (gage) at ordinary air temperatures has been published, and can be purchased through the headquarters of the association, 29 West thirty-ninth Street, New York, N. Y.

*Methods for screen testing of ores.*—The mining standardization correlating committee has voted to recommend to the association the approval as American recommended practice of the proposed standard methods for screen testing of ores. The proposed standard was submitted to the committee by the American Institute of Mining and Metallurgical Engineers, sponsors for the project.

*A. S. C. E. withdraws projects.*—The association has been advised by the American Society of Civil Engi-

neers of the A. S. C. E.'s decision to withdraw the two standardization projects on steel railway and highway bridges. These specifications were originally submitted to the association by the A. S. C. E. in 1923 and 1924 with a request for their approval as existing standards, but as a result of further consideration by all interested parties the society has withdrawn its submittal of these projects.

*Nomenclature of lathe tools.*—As a result of a questionnaire on nomenclature of lathe tools sent out recently by the association to a number of American experts, a new technical committee on nomenclature has been organized by the sectional committee on small tools and machine-tool elements. The questionnaire sent out by the association showed sketches of the most commonly used shapes of lathe tools, with the request that the person to whom the questionnaire was sent indicate the names by which he would designate the respective tools.

The replies received showed a surprising divergence. Not only were different designations used for the par-

ticular function of the tools, but what was more important, even the designations "left hand" and "right hand" were not used in the same manner. What was called a "right-hand straight turning tool" by one expert was designated by another as a "left-hand straight roughing tool"; a tool called in one reply a "left-hand boring tool" was called a "right-hand hook tool" in another, and again, "a right-hand boring tool" in a third reply.

It is believed that the problem concerned might well be solved independent of the question whether or not dimensional standardization of the tools should be undertaken. The least that could be done is to avoid the confusion resulting, for example, from a user of roughing tools ordering a "right-hand" type and receiving what he calls the "left-hand" type, simply because the manufacturer uses the two terms the other way around. Incidentally, nomenclature for milling cutters has been well taken care of in the American standard, including such terms as "right hand" and "left hand." The establishment of such a set of definitions, therefore, seems to be equally desirable for such a simple but widely used object as lathe tools.

*Classification of coals.*—A background of data and facts upon which the classification of American coals can now proceed was provided by an all-day symposium on coal classification held as part of the program of the annual meeting of the American Institute of Mining and Metallurgical Engineers on February 15. The symposium consisted of 12 papers dealing with the physical and chemical properties of coals and the requirements of coal for various uses. The material presented was the result of important investi-

gations made under the auspices of the sectional committee on classification of coals under the procedure of the association. It is expected that considerable progress will be made in the next 12 months by the committee as a result of the background furnished by these investigations.

At the meeting of the sectional committee on February 15, an important progress report covering a proposed scheme of classifying coal on the basis of ash-free calorific value and fixed carbon was submitted by the technical committee on scientific classification of the sectional committee. A chart was shown in which the various ranks of coal ranging from lignite to anthracite were plotted according to the heat units and fixed carbon. The chart clearly showed that the B. t. u. decreased with the rank of the coal. The sectional committee voted to request the subcommittee on proposed methods of classification to present at the next meeting of the sectional committee a systematic grouping of American coals with the limiting figures for heat units and fixed carbon for each class of coal.

*National Electrical Code.*—An interim revision to the National Electrical Code has been approved by the committee in charge of the code. In accordance with the procedure for interim changes of the National Electrical Code, the proposed changes will be reported to the next meeting of the sponsor body, the National Fire Protection Association, and thereafter to the American Standards Association. The revision was proposed in order to accomplish the recognition of asbestos-insulated conductors in addition to the present recognition of the slow-burning type of insulation.

## STANDARD METHODS FOR CONTROLLING STREET-MAINTENANCE OPERATIONS

Representatives of nine nation-wide organizations of public-works officials and research agencies convened in Detroit during the twenty-ninth annual convention and road show of the American Road Builders' Association, to initiate an intensive study in street maintenance economics. A committee was designated by the meeting to provide street maintenance engineers with the various records, accounting, and other administrative devices which must supplement a good organization and technical ability if effective street-maintenance work is to result. Standard methods for controlling street-maintenance operations, for measuring the amount of work done and its cost, the accounting for expenditures, and for preparing street-maintenance work programs and budgets will be formulated.

One of the first activities of the committee will be the design of a record and cost system to aid city officials in determining when streets should be repaved. There is a period in the life of any paved street when the costs of maintenance exceed the spread cost of reconstruction. A few cities already keep such records for determining their street-maintenance programs, and the committee will endeavor to standardize these practices so that they may be applicable to a city of any size or form of government. An analysis of street-maintenance costs also will aid the maintenance engineer in determining the kinds of pavements

most economical for different types of streets and varying traffic conditions. Cities are now much interested in the use of low-cost pavements. The conditions under which such pavements are economical can be ascertained only through adequate street-maintenance records.

The committee found that the methods and records employed in most cities in connection with utility cuts and reconstruction are unsatisfactory. Certain standard proposals will be made to remedy this situation. To aid street-maintenance engineers in controlling expenditures so that the city appropriations will not be overexpended at the close of the year, a model appropriation-accounting scheme will be developed. These recommendations will be designed also to improve the accounting for gasoline and motor funds and to prevent such funds from being used for other than street purposes. The laboratory method for testing these proposals will be employed. Just as hypotheses in the realm of physical science are thoroughly tested before general acceptance is made of them, experimental installations of these proposals will be made in cities of various sizes and varying conditions in order to prove that they are workable. Much study of present methods will be required before the exact nature of these experimental demonstrations can be determined.

The work of the National Committee on Street Maintenance Economics is financed and staffed jointly by the American Road Builders' Association and the research committee of the International City Managers' Association.

## PAIN T INDUSTRY PROMULGATES STANDARDIZATION PROGRAM

Standardization Program of Industry to Become Effective September 1, 1932

By H. A. MELUM<sup>1</sup>

There is probably no activity in our industry that is of any greater interest to the entire membership of the National Paint, Oil, and Varnish Association than that of simplification and standardization. Its influence is far-reaching and affects all branches of our industry, from the producer of raw materials to the ultimate consumer. The manufacturers, the distributors, and the dealers of paint products are most decidedly and definitely affected by this work, and it is therefore worthy of the support and cooperation of every member.

The committee on simplification and standardization is a joint committee of the three associations, namely, the American Paint and Varnish Manufacturers' Association, the National Paint, Oil, and Varnish Association, and the National Association of Paint Distributors.

Attention is called to the distinction made regarding simplification and standardization in trade practices, as to the number and sizes of containers that are used and the number of tints and colors that are marketed in various lines of products, and that which relates to the individual choice of the types and kinds of containers that are used as well as the selection of tints and colors. It is the unit on which a price is based and the number of tints and colors in a line of products that establishes the market and consumer demand and these are the facts over which the industry have control through simplification and standardization according to its desires. It is the purpose of the committee to study the requirements of the trade in this regard and to make such recommendations as will entirely satisfy consumer demand and at the same time result in certain economies to the manufacturers, distributors, and dealers of paint products.

A simplification program was generally accepted by the industry to become effective on July 1, 1926. Last fall a questionnaire was sent to 544 paint manufacturers, outlining the restrictions imposed by this program in order to obtain definite information as to the extent of its adherence, and also to obtain an expression in regard to certain suggested revisions. An exceptionally large reply was received to this questionnaire, and, as a result a revised program of simplification and standardization was presented to the 1931 conventions of the National Paint, Oil, and Varnish Association and the American Paint and Varnish Manufacturers' Association, and to the annual convention of the National Association of Paint Distributors in February, 1932, with the result that all three of these associations have unanimously approved the adoption of the following program, to become effective on or before September 1, 1932:

1. No 2-pound and 3-pound cans to be sold in any line. This is a restriction that has been effective for several years, and concerning which the replies to the questionnaire indicated that 73 per cent of those who

replied were adhering to this restriction and that 96 per cent voted approval of it.

2. No sizes less than quarter-gallon cans to be sold in barn and roof paints, and no sizes less than gallon cans in shingle stains. This is a restriction that has been effective for several years, and concerning which the replies to the questionnaire indicated that 89 per cent of those who replied were adhering to this restriction and that 98 per cent voted approval of it.

3. Half-gallon cans shall be eliminated from aluminum paints, barn paints, roof paints, auto-top dressing, auto enamels, wagon and carriage paints or enamels, oil stains, and varnish stains. This is a restriction that has been in effect for several years with the exception that oil stains, spirit stains, varnish stains, and aluminum paints were added to the list of products to which this restriction should apply. The answers to the questionnaire on this item indicated that 33 per cent of those who replied were adhering to these restrictions and that 75 per cent voted approval of it.

4. The half-pint cans shall be eliminated from first-grade house paints. This is a new restriction, and concerning which the replies to the questionnaire indicated that 53 per cent of those who replied were already adhering to this restriction and that 91 per cent voted approval of it.

5. The half-pint cans shall be eliminated from first-grade flat paints. This is a new restriction, and concerning which the replies to the questionnaire indicated that 68 per cent of those who replied were already adhering to this restriction and that 95 per cent voted approval of it.

6. The quarter-pint cans shall be eliminated from all house paints and flat paints. This is a new restriction, and concerning which the replies to the questionnaire indicated that 93 per cent of those who replied were already adhering to this restriction and that 98½ per cent voted approval of it.

7. No oblong or square varnish cans to be used in sizes smaller than one-half gallon for any product, excepting carriage and automobile clear varnishes, varnish removers, bronzing liquids, Japan and liquid driers, penetrating stains, and spirit stains. This is a restriction that has been effective for several years and concerning which the replies to the questionnaire indicated that 64 per cent of those who replied were adhering to this restriction and that 88 per cent voted approval of it.

8. No shades or tints to be produced by any one concern in excess of the following maximum numbers:

Interior flood paints and floor enamels.....	10
House paints.....	32
Flat wall paints.....	20
Enamels.....	18
Porch paints.....	8
Roof and barn paints.....	4
Shingle stains.....	14
Auto and carriage paints or enamels.....	10
Oil stains.....	10
Varnish stains.....	8

<sup>1</sup> Chairman, simplification committee, American Paint and Varnish Manufacturers Association (Inc.).

Spirit stains.....	14
(All the foregoing exclusive of black and white.)	
Oil colors.....	32
(Including black, but counting the several shades of a single color as one color.)	
Architectural and marine varnishes, interior and exterior...	10
Other varnishes.....	28
(Including all not specified above, such as Japan driers, asphaltum, etc.)	

The changes adopted in the various items under this restriction are increasing the maximum number of house-paint shades or tints to 32, and the maximum number of enamel shades or tints to 18. A vote running from 87 to 98 per cent was registered in favor of these restrictions.

9. Oil colors and paste goods shall be sold by liquid measure and only in three sizes, namely, gallons, quarts, and half pints. This is a new item and involves changes in a long-established custom of the basis on which such products are merchandised.

There is certainly no one familiar with the merchandising of oil colors and paste goods who do not recognize the element of waste and the many undesirable features connected with the present methods of packing such products. Some few years ago, when through simplification work the 2 and 3 pound packages in paste goods were eliminated, the manufacturers, as well as the trade, were able to effect certain economies, resulting principally from a reduction in the number of sizes of cans that were required and a consequent smaller investment in stocks. This simplification measure has been quite generally accepted in the trade and at present these products are quite commonly sold in 1, 5, 12½, and 25 pound packages.

While this standardization eliminated a large number of special size cans that necessarily had to be used because of the great variation in the bulking values of paste goods, the manufacturer is still obliged to use quite a large number of special size cans to satisfactorily pack and sell these products on a poundage basis in the sizes that are now marketed. The number of these cans varies, of course, with the different concerns, depending upon the various combinations in sizes in cans that are used for the purpose.

It is estimated that there are approximately 25 special sizes in cans used in the industry for paste goods, and when it is considered that in many instances the regular liquid-measure cans also are used for this purpose it develops that there are probably as many as 30 different sizes in cans that are used in the industry for the packing of paste goods. Furthermore, because of the desire of manufacturers to confine themselves to as few special-size cans as possible, many of the cans that are now sold are only partially filled because of the variation in the bulking value of the different products, and a certain waste is encountered in this regard by not utilizing the full value of the package.

The new method is one that not only permits of reducing the number of sizes commonly packed and sold, but as well filling the package to the full amount that each will contain, which will bulk standard liquid measure in the three sizes. Because of the varying weights that will be encountered in this procedure, it will necessitate that costs and selling prices be estab-

lished on the various cans according to the weight that each package contains, and to designate them as half-pint, quart, and gallon. The new method will give the dealer a uniform size in his packages for liquid and paste goods and thereby very materially improve the appearance of the stock of paint products on a dealer's shelves.

The large variation in sizes of cans for paste goods to-day surely contributes a great deal to the unattractiveness of a stock of paint products. The new method will increase the efficiency of shelf and bin space. While we might well expect a little inconvenience in the adoption of this restriction because of the departure from a practice that has been standard for so many years in the industry, the advantages that will accrue are so many that it is worthy of the support of every person in the industry because it can well be considered one of the most progressive actions that the industry has ever undertaken.

It is not anticipated that any amount of consumer resistance will be experienced because it is felt that the purchaser of oil colors desires to procure a given bulk quantity which, through custom, has been commonly described on a poundage basis. Can it not well be assumed, therefore, that it will be a very easy matter for the purchaser to describe the volume which he is desirous of procuring by the standard liquid measure, which is so commonly used and generally accepted, and with which one is also so familiar?

A few of the advantages of this plan are: (1) Eliminating all special size cans now used for the purpose; (2) eliminating all special size packing cases now used for the purpose; (3) utilizing full capacity of cans; (4) standardizing on can quantities, the same as for liquid goods; (5) standardizing on uniform size labels for all products; (6) reducing equipment for closing and labeling cans; (7) improving appearance of dealers' stocks because of uniformity in sizes of all cans of paint products; and (8) saving in investment in inventory of cans, packing cases, equipment, and finished products.

Probably no matter of equal importance has ever before been presented to the industry in which a greater interest has been displayed. On this restriction 183 manufacturers of oil colors and paste goods express themselves, and 169 of these were unqualifiedly in favor of it. The 14 manufacturers who voted against this proposed change would undoubtedly be in favor of it if they knew such a large majority were accepting its provisions. When we consider that 92 per cent of the number of those voting approved the plan, and that the tonnage sales of these manufacturers represents even a much larger percentage, it is safe to assume that this restriction will become a 100 per cent standard practice in our industry within the time that has been fixed for its adoption, September 1, 1932.

The entire simplification program has met with such a highly favorable response from the large number of manufacturers who have expressed themselves in this regard that there seems to be no question but that within the time set for the final adoption of this program there will be a complete acceptance of it.

## MECHANICAL SAFETY STANDARDS

### Standards Developed by Experiment at Bureau of Standards for Adoption by Manufacturers

By HAROLD S. NORTON, *Bureau of Standards*

The Bureau of Standards, through its section of safety standards, is active in preparing and revising a number of nationally recognized industrial safety codes. The major function of these codes is to guide practice in securing the elimination of waste in life and limb in the manufacturing and other industries of our country. The lack of national uniformity in safety codes and laws of the various States results in retarding developments toward safety in industry.

It has been demonstrated that a national safety code receiving the general support of all those affected can accomplish much good. Economy and convenience to the buyer, the seller, and the user of mechanical equipment can be effected through safety standards. Standardized design with safety features incorporated means ultimate economy.

Most good codes or rules or even laws are evolutionary rather than revolutionary. Machinery in use before a rule is formulated can not always be immediately scrapped. Many machines which are originally unsafe can be made safe by the addition of some device or accessory. In this way the old machine need not be discarded, but may still have years of useful service. In the meantime new machinery can be made with the safety features built in, and development can go forward.

Among the codes in whose preparation the Bureau of Standards has acted as a sponsor are the American Logging and Sawmill Safety Code; the Safety Code for Elevators, Dumb-waiters, and Escalators; and the National Safety Code for the Protection of the Heads and Eyes of Industrial Workers.

The bureau has also participated in the work of committees preparing and revising a number of other nationally recognized industrial safety codes. Some of those which have been completed are the Code for Mechanical Refrigeration, Textile Safety Code, Code for Window Washing, Code for Floor Openings, Railings, and Toe Boards, and Factory Lighting Code.

The following codes are among those yet incomplete: Code for Walkway Surfaces, Code for Conveyors and Conveying Machinery, and Code for Cranes, Derricks, and Hoists.

All of these mechanical safety codes have been developed under the procedure of the American Standards Association, which is a federation of technical societies, trade organizations, and Federal Government departments. Under its procedure standards may be initiated by any responsible group. Representative technical committees are appointed to study and formulate the standards, and in this way when it is found that the predominating opinion of members of the specific committee is favorable the code developed becomes either a "recommended practice," an "American tentative standard," or an "American standard."

The National Safety Code for the Protection of the Heads and Eyes of Industrial Workers is a typical American standard. This code was first issued in 1921. It was prepared with the cooperation of an

advisory committee consisting of persons who were selected because of their interest in, and knowledge of, the subject and as being typical representatives of the interests most closely concerned.

The need for definite requirements to protect the eyes of industrial workers is shown by the large number of industrial accidents resulting in eye injury. Most of the eye accidents reported are of a mechanical nature. The mechanical hazards to the eye are such as to frequently go without attention in a shop until an accident occurs. Rules have, therefore, been devised to give protection under specification working conditions.

The operations and processes which are so hazardous as to make it desirable for workmen to be provided with special protection to the head and eyes are varied. In the code, hazards which may produce mechanical injury to the eye are classified so that employer, administrative authority, or other responsible party can assign the particular operation concerned to its proper group.

The hazards from flying solid particles ordinarily encountered are separated into three groups designated A, B, and C. The first group includes all operations, such as chipping, calking, and riveting, wherein the mechanical hazard is so great as to warrant the selection of protectors, the parts of which have passed mechanical tests assuring adequate strength.

In class B are grouped all operations, such as scaling, grinding of metals, stone dressing, and some woodworking operations, in which the protector must prevent the entrance of small flying particles into the eye. Definite strength is not called for in class B protectors.

Class C is for occupations similar to auto driving where protectors are used merely to protect against dust and wind, and hence no special strength tests are necessary.

Goggles specified in group A and used in such operations as chipping, calking, and riveting may be subjected to blows directed from any position in front of the operator. This makes it necessary for these goggles to give side protection. This is accomplished by using side shields of the eyecup style of goggle.

The severe mechanical shocks to which chippers' goggles or others in class A may be subjected make it necessary that the frames and lenses be of sufficient strength.

The code provides that where strength tests on goggle frames and lenses are required, only representative samples shall be selected for the purpose. These samples are not to be used in service, however. The tests indicated in the code are designed to give evidence that these goggles will withstand the demands of service. It is pointed out that goggles unable to pass these tests may fail to protect if worn in service, or in the event of their being subjected to a blow, the goggles themselves may be a source of hazard.

Lenses are subjected to what is known as the "drop test," in which a steel ball of specified weight and

diameter is dropped from a predetermined height. If the lens can successfully withstand this test, it is assumed that it will be satisfactory under actual service conditions.

The code recognizes the fact that if goggles are to be practical as protectors, they must be comfortable to the wearer. They must be free from jagged ends, and the lenses must be optically correct so that the wearer's eyes are not strained. In addition the construction must be such as to permit folding so that they may be stored in a case or container when not in use.

National codes can be made useful and effective in industry by giving them a wide circulation through the various national trade associations, the labor departments of the various States, labor unions, technical societies, insurance and safety organizations. Duplication of effort in the formulation of local codes can thereby be eliminated. In this way model uniform regulations can be set up which would prevent confusion in their interpretation and enforcement, as is often the case when separate rules are made by organizations independent of each other.

## BOTTLED-BEVERAGE INDUSTRY

### Standardization and Simplification of Interest to American Bottlers of Carbonated Beverages Since 1919

By JUNIOR OWENS, *Secretary, American Bottlers of Carbonated Beverages*

One of the first concerns of the American Bottlers of Carbonated Beverages, following its organization in 1919, was the promotion of standardization within the industry. Since then the national association has consistently initiated, led, and fostered movements for uniformity in beverage manufacturing practices and plant sanitation and the standardization of equipment and supplies.

The first step was the approval of a suggested uniform sanitary law, setting forth the requirements that should be met in the manufacture of beverages throughout the country. Through the cooperation of State organizations affiliated with the American Bottlers of Carbonated Beverages, laws in many States governing beverage manufacture and plant sanitation were amended, or enacted, in accordance with the suggestions recommended in this uniform sanitary law, so that to-day most of the State beverage laws, while not identical in wording, are substantially the same with regard to requirements.

To further promote sanitation and uniformity in the industry, the national association recently prepared a sanitary code for the beverage industry, modernizing and amplifying the original draft of its suggested uniform sanitary law and setting out detailed sanitary requirements with respect to buildings, machinery, and equipment, manufacturing methods, ingredients, and personnel. This code has been published and widely circulated among the industry and among State food regulation and inspection officials and it has been favorably commented upon generally.

Supplementing the A. B. C. B. sanitary code, and in order to provide a standard basis, or yardstick, for grading bottling plants in accordance with its requirements, the A. B. C. B. score card has been prepared. The general use of this score card in the industry as a means for self-inspection is being vigorously promoted by the national association for the purpose of establishing standard practices in beverage manufacture and plant sanitation on an even higher plane than the requirements of State laws and regulations.

The national association also is giving very careful study and doing much research work with a view to the development of uniform standards for the various types of beverages made and marketed throughout the country. This work ties up with the purpose of developing a system of certification. It is hoped that as this work progresses, generally acceptable and high

standards for each type of beverage will result which, with the provisions of the A. B. C. B. sanitary code, will form a uniform basis for beverage manufacture. This uniform basis once established would enable the certification to the purchasing public of the products of beverage manufacturers who comply with its requirements or standards.

Standardization and simplification in the mechanical end of the industry also has received much attention. To aid in this work, the beverage allied industries council was organized several years ago. This council is composed of makers of beverage manufacturing equipment and supplies who are affiliated with the American Bottlers of Carbonated Beverages. When beverage manufacturers, through the A. B. C. B., by which initials their national association is popularly known, propose standards relating to their particular end of the industry, such proposals are submitted to the council for consideration and recommendations. Conversely, standards proposed by members of the council, the manufacturers of the beverage equipment and supplies, which relate to beverage manufacturing practices or materials used by beverage manufacturers, are referred to a general committee, including the latter in its membership, for consideration. This arrangement insures that thorough consideration from each angle is given to all proposals for changes in standards for equipment or practices in the industry before they are finally approved and promulgated.

To date standards have been agreed upon for certain dimensions of bottle boxes, sizes for water supply lines for carbonators, carbonated water connections for carbonator and filler machines, sirup-line connections, straight and tapered pipe threads, conveyor chains, beverage bottle crown finish, and caustic content of bottle-washing compounds. Recommended practices approved concern diameters of rubber hose and block tin tubing, couplings, carbonated water and sirup valves, carbonating equipment units, and gas volume test and chart.

The American Bottlers of Carbonated Beverages has taken a very active interest in the simplification work carried on with the cooperation of the Bureau of Standards of the United States Department of Commerce, and has advocated adherence to a simplified list of bottle sizes which was developed and promulgated by the industry.

## SAFETY OF RAILWAY EQUIPMENT UNDER INVESTIGATION

### Supervisory Activities of Bureau of Safety of Interstate Commerce Commission

By W. P. BORLAND<sup>1</sup>

The Bureau of Safety of the Interstate Commerce Commission is charged with the duty of administering the Federal laws for the protection of travelers and employees upon railroads engaged in interstate commerce. These laws require the railroads to equip their cars and locomotives with certain prescribed safety appliances; empower the commission to investigate devices intended to promote safety in railroad operation; and require the installation of automatic train-stop or train-control devices to prevent collisions between trains, when ordered by the commission.

It is the duty of the railroads to know that cars and locomotives are equipped as the law directs, and that no vehicles with defective equipment are permitted to run; for this purpose they employ inspectors and repairmen who are constantly engaged in the inspection and maintenance of safety appliances on trains before departure from terminals, at various points en route, and upon arrival at terminals, for the purpose of insuring that cars are equipped as required by law and that the required appliances are maintained in safe and suitable condition for service.

The law requires locomotives to be equipped with power driving-wheel brakes and appliances for operating the train brake system, and forbids the operation of any train on a railroad engaged in interstate commerce with less than 85 per cent of the cars in such train equipped with operative power brakes, so that the engineer of the locomotive hauling the train may control its speed without requiring brakemen to use the common hand brake for that purpose.

It is further required that all power-braked cars in any train which are associated together must also have their brakes used and operated. As practically all cars in service are now equipped with power brakes, the result is that almost without exception trains are fully equipped and controlled by power brakes.

Many accidents due to similar causes, occurring year after year in different sections of the country, point to the necessity for the general application of additional safeguards, and it is upon the basis of such records that the commission has issued its orders requiring

certain railroads to install automatic train-control devices upon their lines, has instituted the proceeding looking toward improved air-brake equipment and maintenance, and has recommended to Congress the enactment of laws requiring the use of steel cars in passenger trains.

Any person who has a device which is intended to promote the safety of railroad operation may file plans and description with the bureau for examination and report. These plans are examined by the bureau's engineers, and a report setting forth the bureau's opinion of the device, including comments upon both defects and meritorious features, is furnished the proprietor. In the course of the investigation, if the device has been built, or if it is in use, a personal inspection is usually made.

If the device possesses merit to the extent that a service trial is warranted the proprietor is so informed; on the other hand, if the device possesses fundamental defects, or if it is little or no better than other similar devices which are available or in use, the proprietor is likewise informed.

The purpose of the bureau in these investigations is to determine just what a device does, how its intended purpose is accomplished, and to what extent this purpose will be affected by service operating conditions, and to make available this information to the proprietor of the device, as well as to any prospective user of the device. The bureau carefully refrains from any action which may be construed as assisting in the commercial exploitation of any particular device. This is a matter for negotiation between the proprietor of the device and his prospective customers.

In connection with automatic train-stop or train-control devices, the bureau examines and reports upon plans of proposed installations, and examines completed installation for the purpose of determining whether or not they are made in conformity with the specifications prescribed by the commission. The bureau's reports form the basis of the commission's approval or disapproval of particular installations. The bureau also publishes an annual statement of the progress made by the railroads in the installation of signals and interlocking plants, this statement going into great detail.

<sup>1</sup> Director, Bureau of Safety, Interstate Commerce Commission.

### MIRROR STANDARD REAFFIRMED

A survey of the mirror industry indicated that roughly 73 per cent of the output of the reporting companies is being manufactured, according to the quality standards indicated in the Commercial Standard for Plate Glass Mirrors, CS27-30.

On the basis of this information, the standing committee of the industry authorized the reaffirmation of the standard for another year and notice to that effect was announced in a recent circular letter from the division of trade standards.

### RAYON FABRICS AND MERCHANDISE

The National Retail Dry Goods Association has requested the cooperation of the Bureau of Standards in the establishment of commercial standards for rayon fabrics and merchandise.

It appears that these projects will cover specifications and composition of rayon merchandise, including weighting and labeling, fabric construction, finishing, and stretching of all rayon fabrics and finished garments.

### FOURDRINIER WIRE CLOTH

The printed pamphlet entitled "Fourdrinier Wire Cloth, Commercial Standard CS36-31," recently released, relates to a standard established as a basis for clearer understanding between the manufacturers and users of Fourdrinier wire cloth. This commodity is a flexible, endless, woven-wire cloth used on paper-making machines. Only one grade, known as the commercial standard grade, is specified, and other grades and meshes are to be considered as special. It is the desire of the manufacturers that the one standard shall be of high-grade workmanship and material, and thus, therefore, provide maximum service and satisfaction in use.

In accordance with the recommendations of the standard, the commercial standard grade of Fourdrinier wire cloth shall contain no imperfections that will shorten its period of usefulness or cause a mark or defect in the finished paper. The number of warp and shoot wires for the 10 standard mesh designations are established and the diameters of the wires before weaving are specified.

The standard provides for inspection, method of packing, wording of labels, and marking of shipping cases, proper storage, unpacking, and installation of Fourdrinier wire cloth.

The commercial standard became effective for new production on November 1, 1931, and for clearance of existing stocks on May 1, 1932. Copies of the publication may be obtained from the Superintendent of Documents, Washington, D. C., for 10 cents each.

### LEATHER BELTING NOW SOLD BY THICKNESS INSTEAD OF WEIGHT

The American Leather Belting Association has announced that for the greater protection of the consumers of leather belting the association has established and will sell this commodity by specifications of thickness instead of weight, thereby discarding the old weight terminology of "ounces per square foot," which may be varied by the mere addition of weighting materials to the leather and does not necessarily always represent a differential in transmission values. The association reached this decision after canvassing all manufacturers of belting throughout the country. Eighty-one replies were received, all in favor of the change, so that the program may be said to have the indorsement of the entire industry.

This is a progressive move for the purpose of establishing higher standards for a product that has been sold by weight for many years. Inasmuch as leather belting prices are based on thickness, the simplicity and common sense of this change has met with the instant approval of both manufacturers and users of leather belting. It simplifies and makes comparatively easy the checking of each piece of belting to ascertain if the average thickness is as ordered.

The thickness specifications now in effect for first-quality leather belting are as follows:

Medium single.....	$\frac{10}{64}$ to $\frac{12}{64}$ inch.
Heavy single.....	$\frac{12}{64}$ to $\frac{14}{64}$ inch.
Light double.....	$\frac{15}{64}$ to $\frac{17}{64}$ inch.
Medium double.....	$\frac{18}{64}$ to $\frac{20}{64}$ inch.
Heavy double.....	$\frac{21}{64}$ to $\frac{23}{64}$ inch.

All thicknesses in this table are average thicknesses in inches and should be determined by measuring 20 coils and dividing this value by the number of coils measured. In rolls of belting containing less than 20 coils the average thickness should be determined by measuring one-half of the total number of coils and dividing this value by the number of coils measured. No point in either single or double belting shall be more than two-sixty-fourths inch thicker or more than two-sixty-fourths inch thinner than the average thickness. The classification of "light single" has been eliminated entirely. The second and third quality brands of each manufacturer bear the same relative thickness to the manufacturer's first quality grades as they did in the past under the old ounces per square foot specification.

These thicknesses are now in effect and should be used by all buyers of belting in wording their orders. Every order for single or double should specify the thickness on the order. If just the words "light," "medium," or "heavy" appear on the order, these words now mean the thickness as per the above table and not the weight as formerly.

### ENGLISH-SPANISH TECHNICAL ROAD TERMS ARE COMPARED

English-Spanish terms used in the construction of highways have been prepared by the American Road Builders' Association in cooperation with leading authorities on the current use in Spanish-American countries.

This glossary attempts a standardization of usage which varies decidedly in different Spanish-American countries. The Spanish equivalents of 2,100 English technical terms used in highway construction and maintenance are given. In a number of cases several Spanish words are used for a single English word, varying in the different Spanish-American countries.

For example, the word "bureau" in Porto Rico is "negociado," in another country "agencia," in still another "oficina," and another "departamento."

### STANDARD FOR BRAILLE PAPER

Upon request of the Library of Congress the Bureau of Standards has been making a study of Braille papers to be used in books for the blind. The results have been reported and will be used in the development of a purchase specification.

There are no standards for such paper, and tests of 11 different papers, both printed and unprinted, used by eight different printers, showed that a considerable variation exists. The special requirement of this paper is that the embossed points forming the printed characters must have sufficient resistance to crushing and yet not feel harsh to the sensitive fingers of the blind.

The former property, tested by measuring the deformation of the character under a fixed load, was found to be closely related to the tensile breaking strength of the paper and its elongation under tensile stress. Detailed requirements for these properties and for weight, thickness, and folding endurance were suggested.

## INDUSTRY CONSIDERS REVISION OF COMMERCIAL STANDARD FOR STODDARD SOLVENT

About four years ago, some of the leading representatives of the cleaning and dyeing industry met under the auspices of the Bureau of Standards with the various oil refiners in an effort to devise specifications for a petroleum naphtha that would be generally suitable for the dry-cleaning industry. This was accomplished and the product was designated as "Stoddard solvent."

Specifications for the material were printed in the form of Commercial Standard CS3-28, which became effective on March 1, 1928. Since that time, however, certain changes in the dry-cleaning industry as well as improvements in refining practice suggested the possibility of revising this standard to cover a material that would shorten the drying time for the cleaning establishment. The standing committee for this project investigated the possibility of changing the distillation range so as to produce a product of higher volatility and thus decrease the time by which clothing and other fabrics had to be tumbled into the driers.

The first reaction to this proposed change on the part of the producers of this material was to the effect that any such change in the distillation range would increase the cost of production, which would necessitate raising the price to the consuming trade. The refiner representatives on the standing committee offered to give this problem further consideration and ascertain to what extent the yield might be reduced if a lower distillation range were written into the specification.

In a desire to have a free discussion of the whole matter with participation from any of the companies interested in producing this material, on request of the standing committee, a special conference was called by the Bureau of Standards in Cleveland, Ohio, on March 7, during the meetings of committee D-2 of the American Society for Testing Materials. The meeting was well attended by representatives of practically all the larger refining companies as well as representatives of the National Association of Dyers and Cleaners and others interested.

Technical discussion on the proposed changes in the distillation range of the commercial standard on Stoddard solvent was led by Dr. Lloyd E. Jackson, industrial fellow of the Mellon Institute of Industrial Research. He indicated that the lowering of the distillation range was desirable chiefly in order to decrease the drying time of garments in cleaning establishments.

Comment was invited from the refiner representatives and the general consensus of opinion, supported by numerous letters, was that the lower distillation range would materially decrease the yield necessitating an increase in price to the consumer.

A very free interchange of opinion on the entire subject indicated that it was highly probable that a limitation of the distillation range might not adequately indicate the type of solvent that is most desirable for the dry-cleaning industry.

It was quite generally conceded that the fixing of only the 10 and 90 per cent points, together with an accurate determination of evaporation of residuum would give a much better indication of a satisfactory

product. Accordingly, the conference voted that the standing committee, in cooperation with the heat and power division of the Bureau of Standards should recommend a test to correlate drying of Stoddard solvent under laboratory conditions with those encountered in the dry-cleaning industry. By subsequent authorization of A. S. T. M. committee D-2 on petroleum products and lubricants, this standing committee was accepted as a technical committee of committee D-2 so as to facilitate recognition of any test for the determination of residuum when approved by the American Society for Testing Materials.

A meeting of the technical committee on Stoddard solvent was held in Cleveland on March 8, and a plan of procedure was developed. To facilitate the work, a smaller subcommittee was formed and plans were made whereby the laboratory tests will be made through the cooperation of the heat and power division of the Bureau of Standards, while the necessary plant tests and demonstrations will be made at the National Association Institute of Dyeing and Cleaning. It is the hope of the committee that sufficient progress might be made to enable them to submit a definite report at the June meeting of the American Society for Testing Materials.

## BRITISH SPECIFICATION FOR LATHE CENTERS

The existing divergencies and variations in engineering practice, with regard to the most suitable angle for lathe centers have recently been investigated by a committee of the British Standards Institution, and its recommendations have been embodied in specification No. 426 (1931).

Recommended sizes of work centers, to be used for various weights of work and speeds of cutting, are given in three charts, and this information is expected to prove of service in engineering workshops. A critical investigation, on theoretical grounds, of the comparative merits of the more commonly utilized 60° and 90° angles is also given in an appendix.

## GRADING RULES A MEANS OF REMEDYING UNFAIR PRACTICES

The American Face Brick Association and the Face Brick Dealers Association of America have announced that standard grading rules for face brick have been formally adopted.

The joint trade-relations committee of the face-brick industry urges that these rules be made a part of the contract form developed by the committee and recommended for use between dealers and manufacturers. The committee also recommends that manufacturers and dealers include on their order forms and in contracts with all buyers the statement that their brick is sold in accordance with the terms of these grading rules.

Seeing in these grading rules the means for remedying unfair practices in the trade, the association states:

Disputes as to the grade of face brick furnished have been hard to settle in the past, simply because there have been no generally accepted grading rules. This lack has made it possible on the one hand for dishonest manufacturers or dealers to cheat the buyer and to compete unfairly, and, on the other hand, for unscrupulous customers to reject good brick.

## COLORS FOR SANITARY WARE

The printed pamphlet entitled "Colors for Sanitary Ware," Commercial Standard CS30-31, has been released and was distributed on March 4 to acceptors of record and others interested.

This commercial standard designates six colors as follows: Green, SC-11; orchid, SC-20; ivory, SC-30; blue SC-40; light brown, SC-51; and black SC-60, to be used as a guide in production and use of plumbing fixtures, and allied sanitary ware products made of vitreous china, porcelain (all-clay) plumbing, enameled iron, metals, wood, or glass. The development of individual colors for special pieces and the matching of colors for special work will not come within the scope of this standard.

The standard states:

that it is not the purpose of this standard to retard initiative on the part of the individual producer or to limit the introduction of new colors, but it is intended to provide an authoritative record of the recommendations of the industry as a whole.

A color chart reproducing the six standard colors, which is, however, intended only to indicate the colors selected by the industry, is included in the pamphlet. The pamphlet explains the procedure to obtain duplicate standard color reference samples for use in production and for sales purposes; it discusses briefly the factors involved in determining the color ascribed to the flat uniform isotropic surface of an opaque object and outlines the methods of making color comparisons. It includes a list of acceptors, a brief history of the project from its inception in April, 1928, until the announcement of its success in June, 1931, and a report of the general conference which adopted and approved the standard colors.

The pamphlet further includes the membership of the standing committee appointed to consider periodically comment or suggestions relative to the standard, in order that it may be kept abreast with progress in the industry and with the demands of purchasers for new colors.

The effective date for new production and for clearance of existing stocks under the commercial standard was fixed as of July 1, 1931, with a normal revision interval of one year.

Copies of this publication may be obtained from the Superintendent of Documents, Washington, D. C., for 20 cents each (stamps not accepted).

## LABELING OF WOOL BLANKETS

A second general conference of manufacturers, distributors, and users of wool and part-wool blankets was held in Chicago on March 2 to consider the adoption of a substitute for the specification recommended by a general conference held in New York on November 20, 1931.

The substitute specification which had the indorsement of a preliminary conference of manufacturers was reviewed and adopted by this general conference which voted that it be sent out for acceptance as the recommended commercial standard of the industry.

This recommended standard provides that no finished blanket containing less than 5 per cent wool shall carry the word "wool" in any form; that blankets labeled with the word "wool" in any form and con-

taining (1) between 5 and 25 per cent wool shall be labeled "Part wool, not less than 5 per cent wool"; (2) more than 25 per cent wool shall be labeled with the guaranteed (minimum) wool content in percentage; and (3) above 98 per cent wool shall be labeled "All wool."

It was brought out in the conference that there have been practically no blankets carrying a wool content of between 5 and 25 per cent manufactured for a number of years, and the text of the specification is intended to discourage the manufacture of blankets carrying quantities of wool between these percentages.

There is a demand for a blanket of low wool content that can be sold at a cheaper price than the one-fourth wool blanket, and for that reason the 5 per cent minimum was included in the standard, the conference realized that no manufacturer will put 9, 15, or 20 per cent wool in a blanket that is to be labeled "part wool, not less than 5 per cent wool."

This specification will be especially helpful to the users of blankets containing a low content of wool for the reason that the cheaper grades of part-wool blankets previously made have contained only a very small quantity of wool, frequently less than 5 per cent, the real value of which was problematical. Under this specification, while there is doubt about any additional warmth being gained by the addition of 5 per cent wool in a blanket, at least there will be no doubt about there being 5 per cent wool present.

For the other items mentioned the label will state the minimum wool percentage a blanket contains, and this should eliminate all misunderstandings that could exist in the mind of the purchaser relative to the quantity of wool a blanket carries. In other words, it should assure her that when she buys a blanket labeled to conform to this standard she may accept it with confidence that it actually contains the percentage of wool stated thereon.

The method used in the determination of the percentage of wool contained in a finished blanket conforms to the methods used and approved by the Bureau of Standards.

A draft of the recommended commercial standard, which includes a report of the general conference, has been prepared for circulation among producers, distributors, and users for written acceptance.

## GALVANIZED SHEETS SOLD UNDER SEAL OF QUALITY

According to a news release of the American Zinc Institute, approximately 70 per cent of the galvanized sheets produced in the United States are sold under the "seal of quality" issued by that institute.

This seal is stamped on galvanized sheets intended for use as an extrudable type of roofing and siding, which are rust-proofed with 2 ounces of zinc per square foot, or approximately two-thirds more than the usual commercial grade. Sheets bearing the seal of the institute are subjected to rigid tests for quality and weight of coating, both by the manufacturer and the American Zinc Institute.

In announcing the program for the annual meeting of the institute, scheduled to be held April 18 to 20, 1932, in St. Louis, Mo., the institute pointed out that the seal-of-quality program will occupy a major part of the agenda for the annual meeting.

## GRADE-MARKED LUMBER ACTIVITIES REVIEWED BY LUMBERMEN

The lumber industry must make good on its pledge to promote and to sell grade-marked and trade-marked lumber, Benjamin W. Downing, the retiring president of the Northeastern Retail Lumbermen's Association, told members of the association at their thirty-eighth annual convention, held January 26-28, 1932, in New York, N. Y.

In his address before the convention Mr. Downing called attention to the movement launched by the Boston chapter of the association to make grade-marked lumber a material demanded by the public and sold by every lumber dealer in the northeastern territory, and expressed a wish that the movement would be taken up by other groups of lumbermen.

"If the quality of the materials we sell is important to the consumer, then what of our construction standards?" he asked. "Dare we permit the return of conditions which permit of the speculator who plunged into the construction industry with no more right to be there than that provided by his grasping nature? No longer can homes be built on the sands of a bonus, with shoddy material and sloppy mechanics, and be sold on the 'dollar down, dollar when you catch me' plan."

It was brought out in the convention that definite steps have been taken to insure the success of the campaign launched by the Boston chapter. An inspection service for all yards has been established by the chapter. Inspection is done in individual yards by an inspector in the employ of that yard, who works in collaboration with the supervisory inspector of the Boston chapter. If the various yards have lumber not officially grade-marked by any of the manufacturing associations, it is graded according to the grading rules of the various species and given the official grade-mark of the Boston chapter which is acceptable to the building commissioner of the city of Boston.

What Quality Standards Mean to the Lumber Retailer and the Construction Industry was the subject of a paper delivered before the convention by Granville B. Fuller, of G. Fuller & Son Lumber Co., of Brighton, Mass., and Frank H. Alcott, of the National Lumber Manufacturers Association, New York. This presentation, which led up to introduction of grade-marked lumber in the building code of the city of Boston, showed in a lucid way just what could be accomplished in eliminating unfair competition and in raising the standard of construction by the introduction of properly grade-marked and trade-marked lumber. The metropolitan Boston retailers, together with manufacturers and wholesalers, worked in conjunction with the building commissioner of Boston in bringing about a standardization of sizes which ultimately developed into a guarantee that grades and sizes would be met. The only practical method of guaranteeing this feature was by adopting grade-marked lumber.

The new provisions of the building code for Boston became effective on April 1, 1932, and require that all lumber used for carrying loads be grade-marked. In enumerating some of the advantages of grade-marked lumber the report of the Northeastern Retail Lumbermen's Association states it will (1) simplify checking of quality by building inspectors, (2) reduce inventories, (3) make competition fairer between bidders,

as they will now figure on the same quality, and (4) assist architects and engineers in writing specifications.

Edward W. Roemer, the building commissioner of the city of Boston, then addressed the convention on the subject of grade-marked lumber from the standpoint of the public interest. He said that a grave duty of protection of the public interest rested on the shoulders of the city officials and particularly that department which had to do with the safety of construction. The work has become increasingly difficult with the complexities of materials and the advanced types of construction, together with multiplicity of sizes and shapes of materials. He decried the apathy with which lumbermen in general considered the question of standardization of grades and sizes as well as their general backwardness in not keeping abreast of the times and conforming their products to the new needs in line with the manufacturers of other materials used in construction.

Mr. Roemer stated that the introduction of the grade-marked lumber provisions into the building code for the city of Boston was in the interest of the public because of the definite guarantee of quality which this measure will bring. He said that not only will this important step be of value to the owner, but it will also strengthen the position of the lumber dealer in the field of competition with other materials.

## SPECIFICATIONS FOR MANILA ROPE

The British Standards Institution has issued two specifications for manila rope. One of these (No. 431-1931) deals with manila ropes for general purposes, such as for lifting blocks, slings, etc. The second specification (No. 432-1931) refers to manila ropes for well drilling.

The first-named specification provides for ropes of 3, 4, and 9 strand constructions of three qualities, namely, "special," "standard," and "merchant," the qualities being so graded that the breaking strengths of a 3-inch circumference, 3-strand rope would be 90, 80, and 70 hundredweight, respectively. In this way it is hoped that the specification will meet the requirements of all branches of industry.

The second specification refers to manila ropes for well drilling and is divided into two parts, the first of which provides for drilling rope, or cable, for percussion well boring, and the second for the "bull" or "calf" ropes used on well-drilling rigs. The drilling rope, which is of 3-strand construction, differs essentially from the "bull" and "calf" ropes in that the conditions of use necessitate very hard lay, special lubrication, the highest procurable quality of fiber, and the maximum elasticity. Full descriptions of the testing recommended when purchasing manila ropes are given in both specifications, and recommendations in regard to factors of safety are included in a foreword to specification No. 431.

It is anticipated that after experimental investigation recommendations will be added covering the minimum diameter of rope sheaves required to give a reasonable endurance in sheaves. Moreover, it is of interest to note that consideration is being given to the question of the preparation of a British standard specification for fiber cores for wire ropes.

### CONFERENCE HELD ON MEN'S SHIRTS

The minimum standard measurements and tolerances for men's shirts (exclusive of work shirts) proposed by the National Association of Shirt Manufacturers and indorsed by a preliminary conference of manufacturers, were adopted by the general conference of producers, distributors, and users of men's shirts (exclusive of work shirts), held in Chicago on March 2.

These specifications are the result of long study by this industry in an effort to select measurements and shrinkage tolerances for men's shirts (exclusive of work shirts) that will prove satisfactory to the greatest number of users.

The immediate object of the adoption of the minimum standard measurements and tolerances is to provide a better understanding between buyer and seller as to what constitutes the proper measurements and shrinkage tolerances for each regular size of men's shirts.

The standard covers the shrinkage of a shirt made from preshrunk material, methods of measuring, and includes a table of measurements for neckband sizes, chest, front, and back length, length around armholes, and sleeve width for each size.

A draft of the recommended commercial standard, including a report of the general conference, has been circulated among producers, distributors, and consumers for written acceptance.

### REVISION OF COMMERCIAL STANDARD FOR CLINICAL THERMOMETERS ADOPTED

A revision of the Commercial Standard for Clinical Thermometers recommended by the standing committee and circulated for acceptance on February 24, 1932, has been accepted by a satisfactory percentage of production and announced as effective June 1, 1932. The revised commercial standard will be designated CS1-32.

As regards accuracy, the requirements are unchanged except in the wording, which is thought to be more clearly expressed in the revision than in the original draft of the standard. By combining the test for "retreaters" with the test at 106° F. an economy in testing is accomplished, and the new test is considered a more severe requirement in this important feature. A new test for entrapped gas is somewhat less severe than the one previously adopted, but is believed to be sufficient and has the advantage of being definitely stated to avoid conflicting practices in testing.

A statement by the standing committee, which accompanied the recommended revision, pointed out that acceptance of the standard by a manufacturer did not prevent his making additional or more severe tests if he desired.

It is hoped that the adoption of this revision will serve to correlate the specifications of various State and municipal regulatory bodies with those of the commercial standard, in order to harmonize divergent requirements that are thought to impose an unnecessary hardship on manufacturers and to serve no useful purpose in the protection of the public. Such correlation should promote adherence and thus furnish additional consumer protection.

### GRADE MARKING OF LUMBER IN OREGON

The Oregon State highway department has adopted the grade-marking plan for the purchase of Douglas-fir timber for structural purposes. The following inspection and certificate requirements are included in all contracts for timber structures and all orders for lumber for maintenance purposes:

All lumber and timber purchased or used under the specifications must bear the standard grade-mark of the West Coast Lumbermen's Association, or, in lieu of such grade-mark, must be covered by a certificate of inspection issued by the West Coast Lumbermen's Association, by the Pacific Lumber Inspection Bureau, or by any other inspection agency designated and approved by the State. Each piece so inspected must be marked with a mark indicating such inspection, and the destination of material or job for which it is intended must be clearly shown on the certificate.

If covered by a certificate of inspection, the certificate must be final as to grade and tally, except that if any lumber or timber apparently shows a gross or marked deviation from the grade under which it was purchased the State may require reinspection of such material under the Reinspection and Shipping Provisions of the Standard Grading and Dressing Rules of the West Coast Lumbermen's Association.

Where lumber and timber are purchased directly by the State, the inspection must be at the expense of the seller; where timber is used in bridge or other structural work let by contract by the State, inspection will be paid for by the State.

The State reserves the right to reject any piece of lumber or timber which is clearly unsuitable for the purpose intended.

### MATTRESSES AND PILLOWS FOR HOSPITALS

The American Hospital Association has requested the cooperation of the Bureau of Standards in the establishment of commercial standards for mattresses and pillows. It is expected that tentative drafts of specifications will be prepared by the committee on standardization and simplification of the above association in the near future. The specifications will cover quality and dimensional requirements for all types of mattresses and pillows regularly used in hospitals and similar institutions, together with provisions covering labeling and certification to buyers.

### HOSPITAL RUBBER SHEETING

Industry has accepted as effective June 1, 1932, a Recommended Commercial Standard for Hospital Rubber Sheeting (CS38-32) drafted by the American Hospital Association in cooperation with the Rubber Manufacturers Association.

The commercial standard follows very closely the Federal specification for this commodity and will require no change in the product of manufacturers formerly supplying rubber sheeting under the latter specification.

Provision for labelling and certification to purchasers under the requirements of the commercial standard were incorporated.

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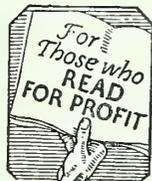
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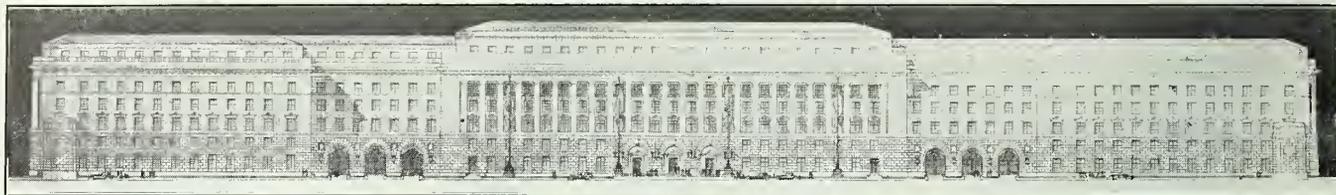
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